Ifremer
Direction de la Technologie Marine et des Systèmes d'Information
Cellule Océano-Météo
Michel Olagnon, Marc Prevosto, Sylvie Van Iseghem

Shell International Exploration and Production, B.V.
Kevin Ewans, George Z. Forristall

May 2004

Shell International
Exploration and Production, BV

WASP

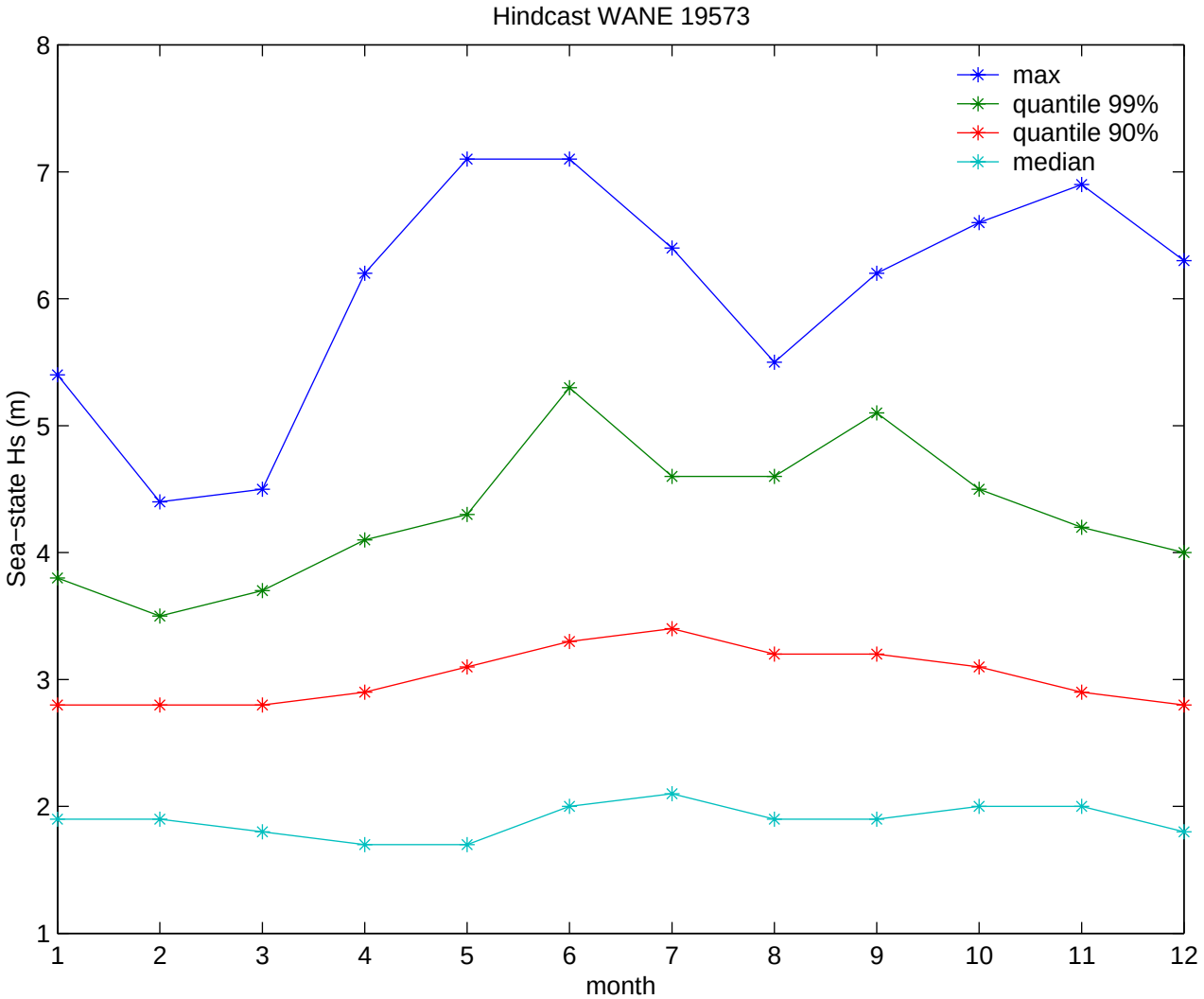
West Africa Swell Project

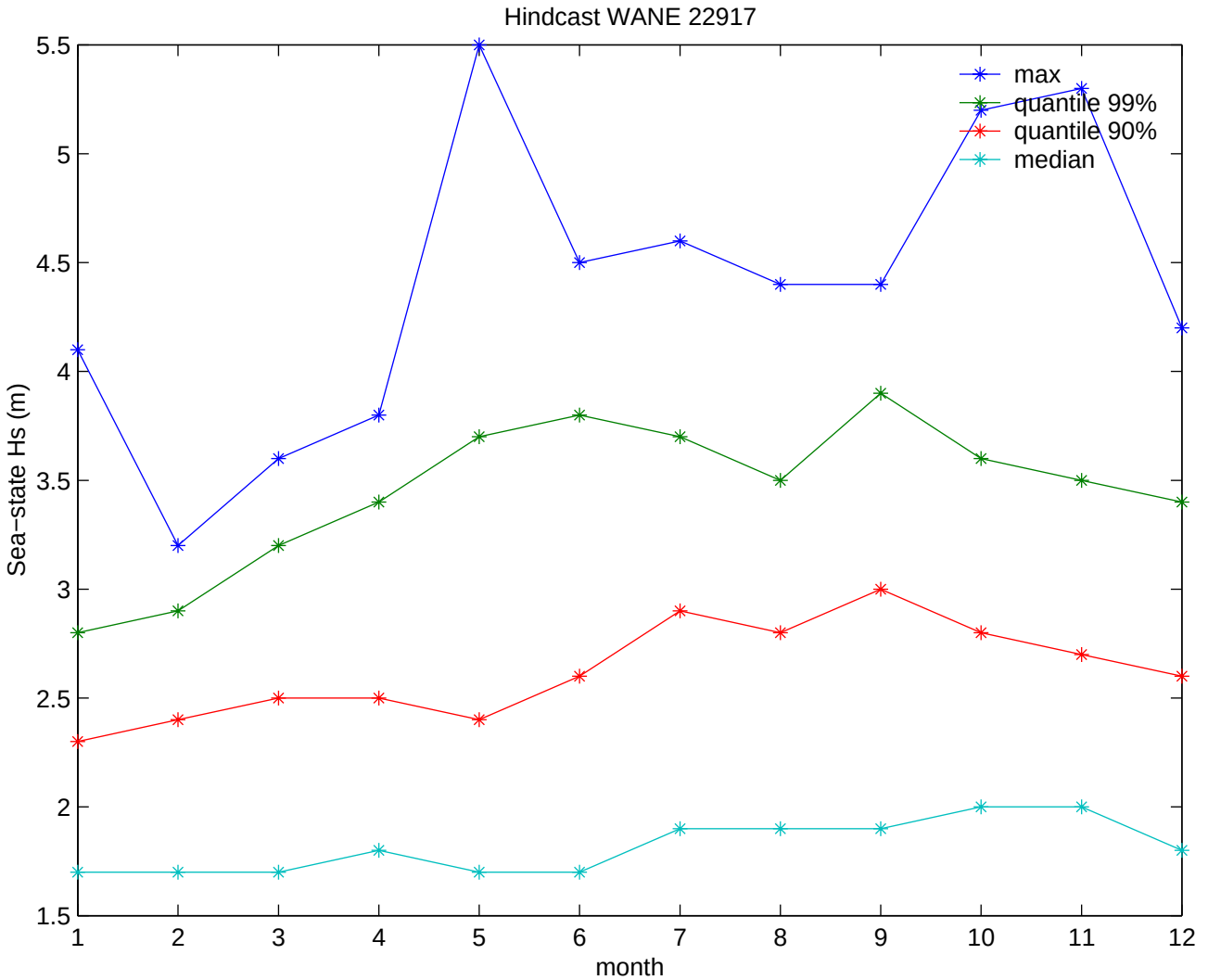
Appendices

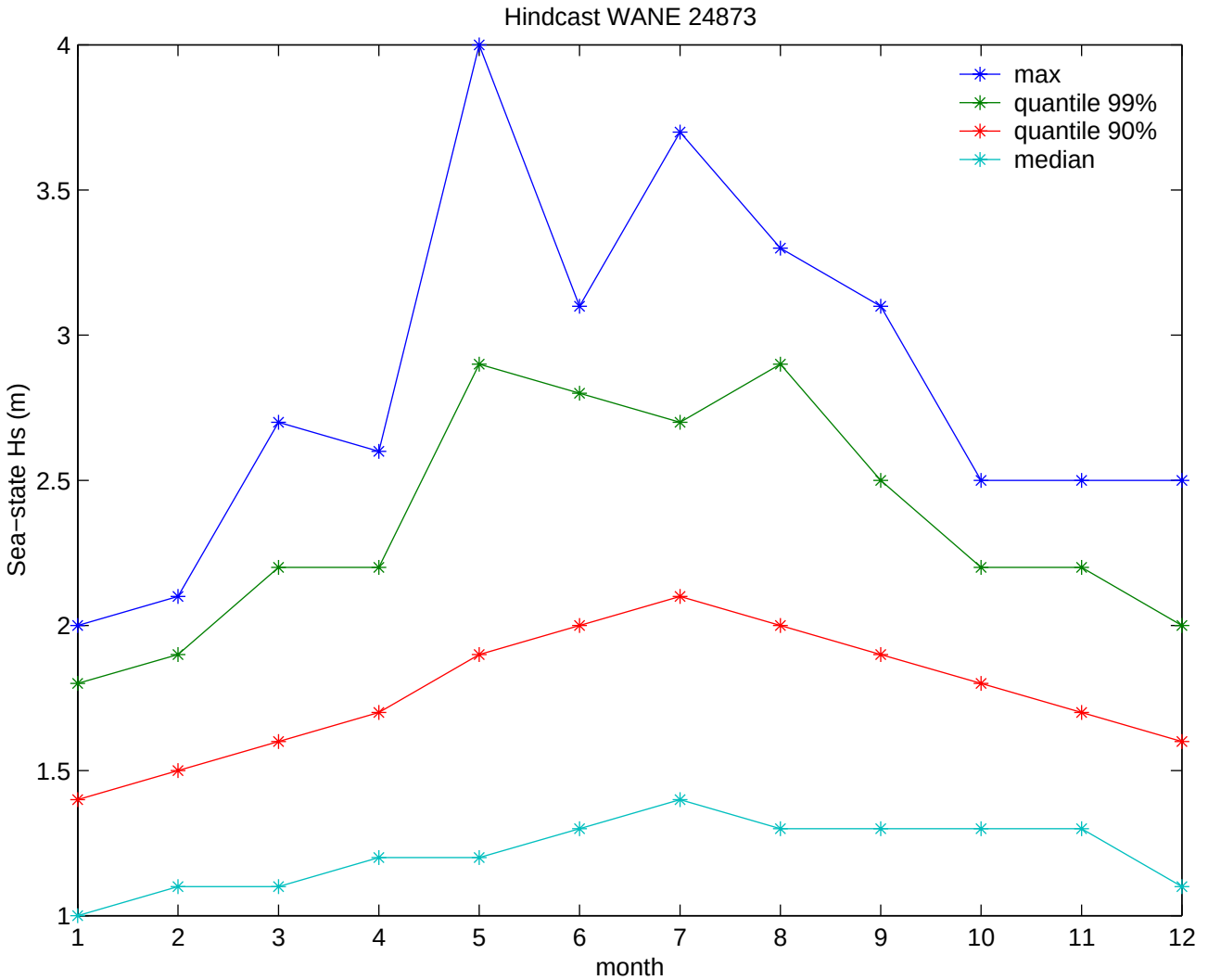
Appendix 3.1

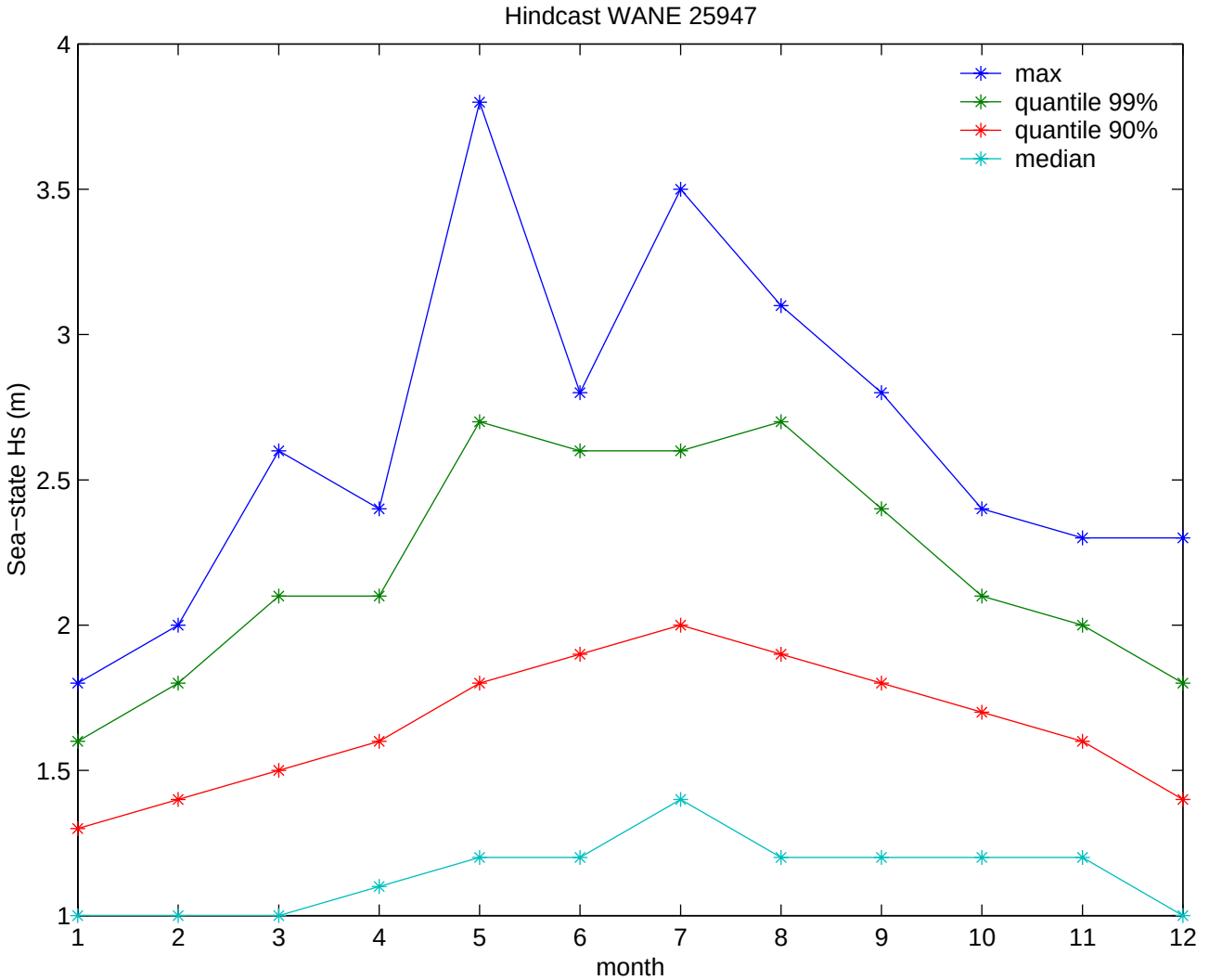
Monthly Sea-state Significant Wave Height

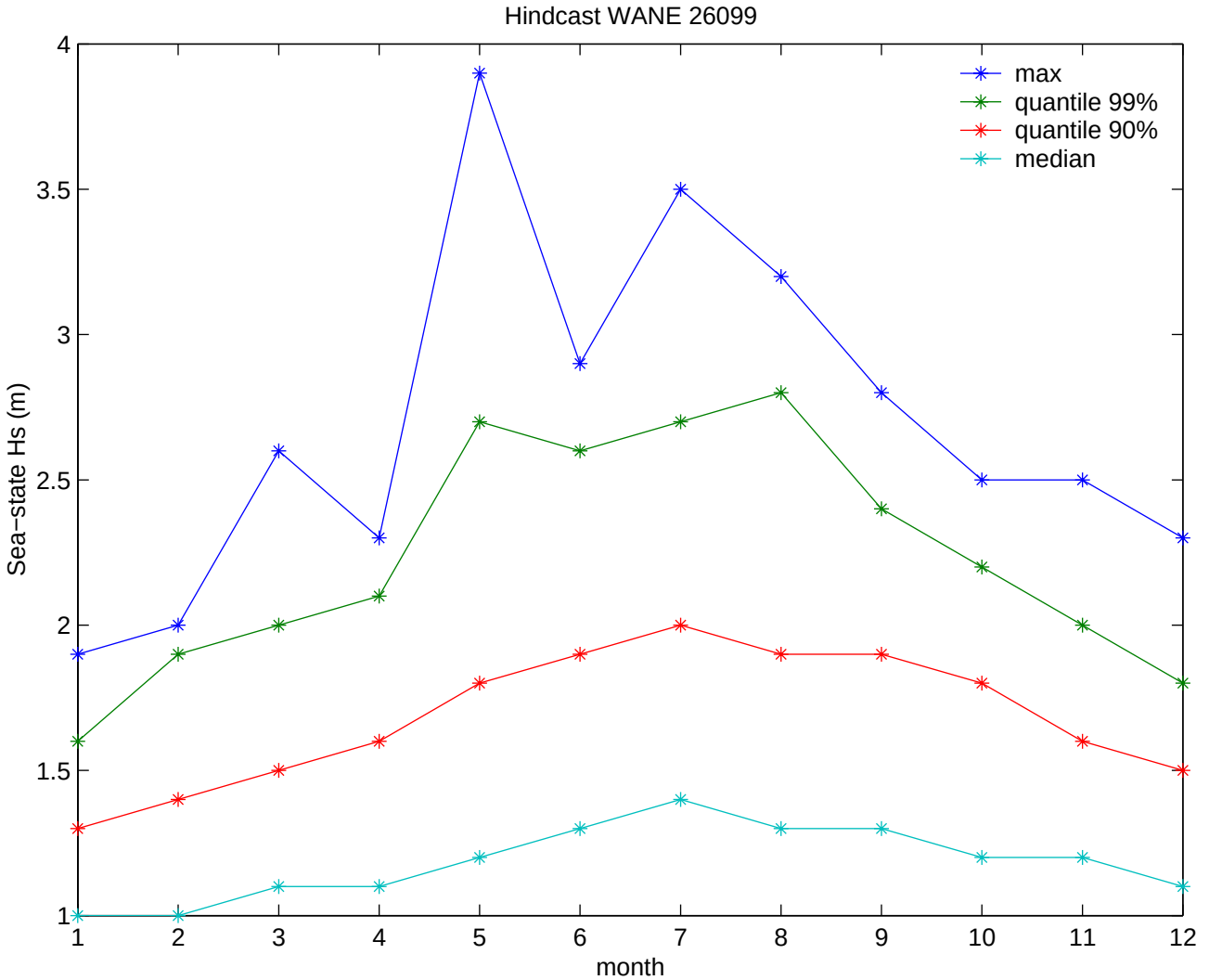
WANE Operational Data

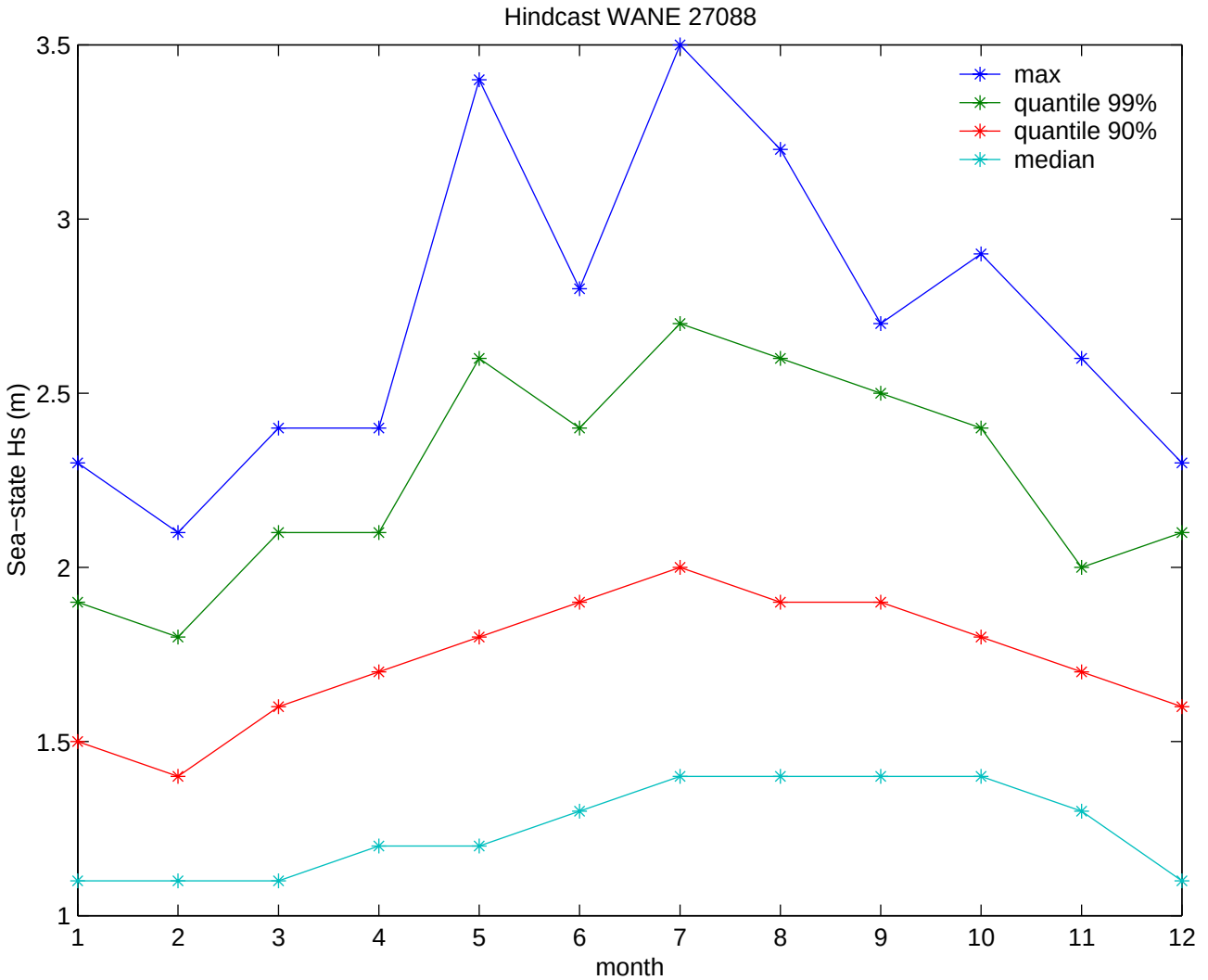

Hindcast WANE 19573
max
quantile 99%
quantile 90%
median
Sea−state Hs (m)
month
1
2
3
4
5
6
7
8
9
10
11
12

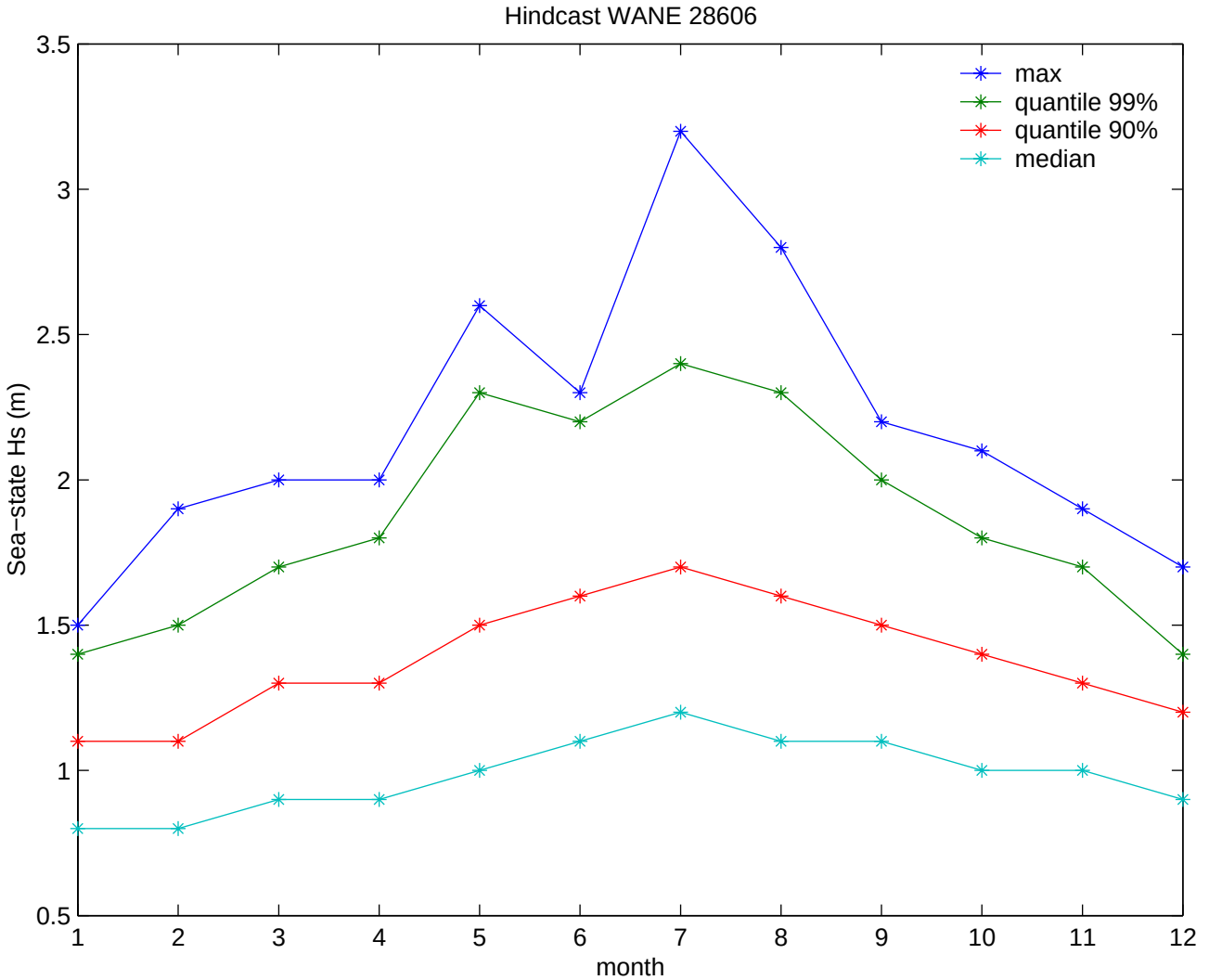

Hindcast WANE 22917
max
quantile 99%
quantile 90%
median
Sea−state Hs (m)
month
5.5
5
4.5
4
3.5
3
2.5
2
1.5
1
2
3
4
5
6
7
8
9
10
11
12

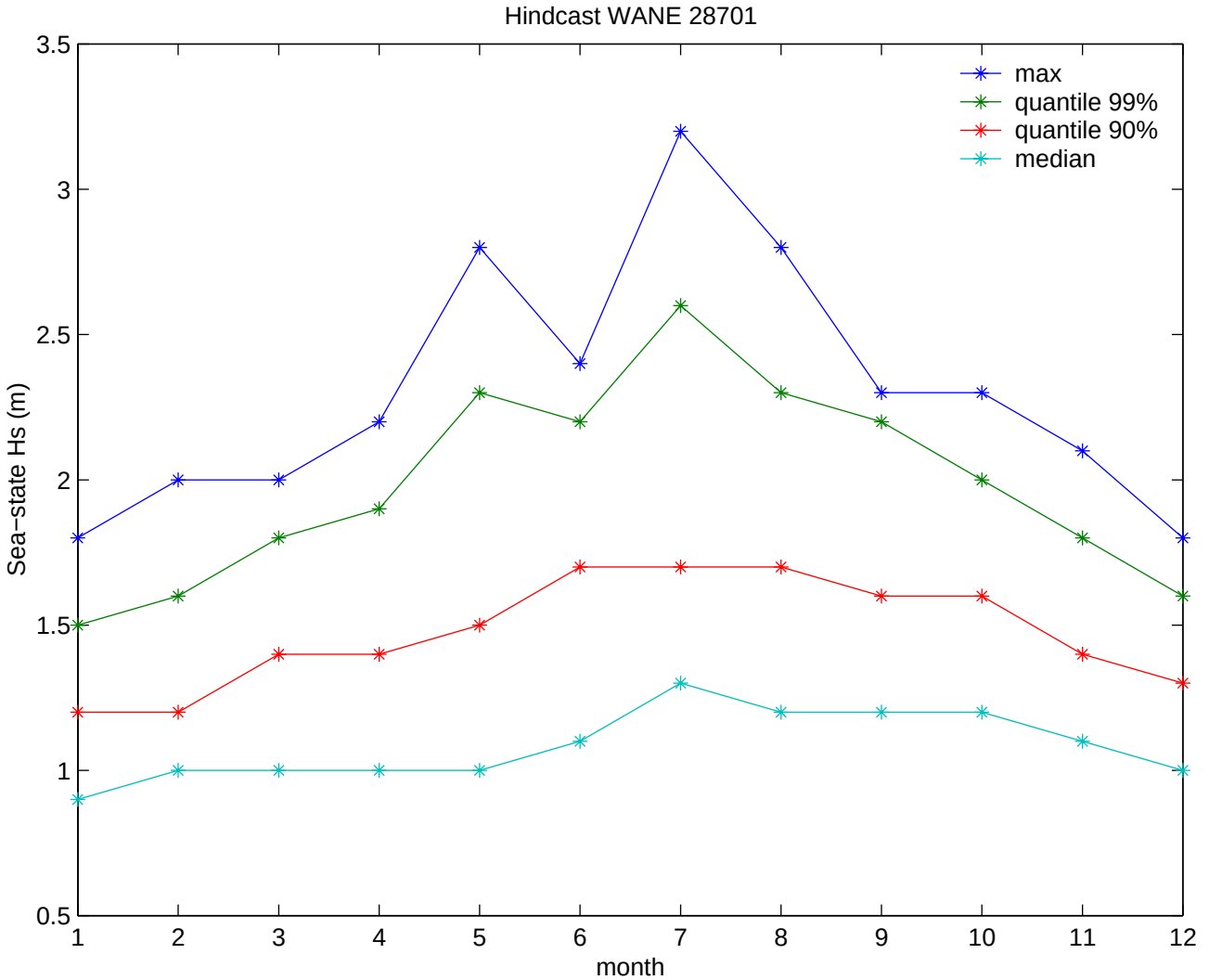

Hindcast WANE 24873
max
quantile 99%
quantile 90%
median
Sea−state Hs (m)
month
4
3.5
3
2.5
2
1.5
1
1
2
3
4
5
6
7
8
9
10
11
12

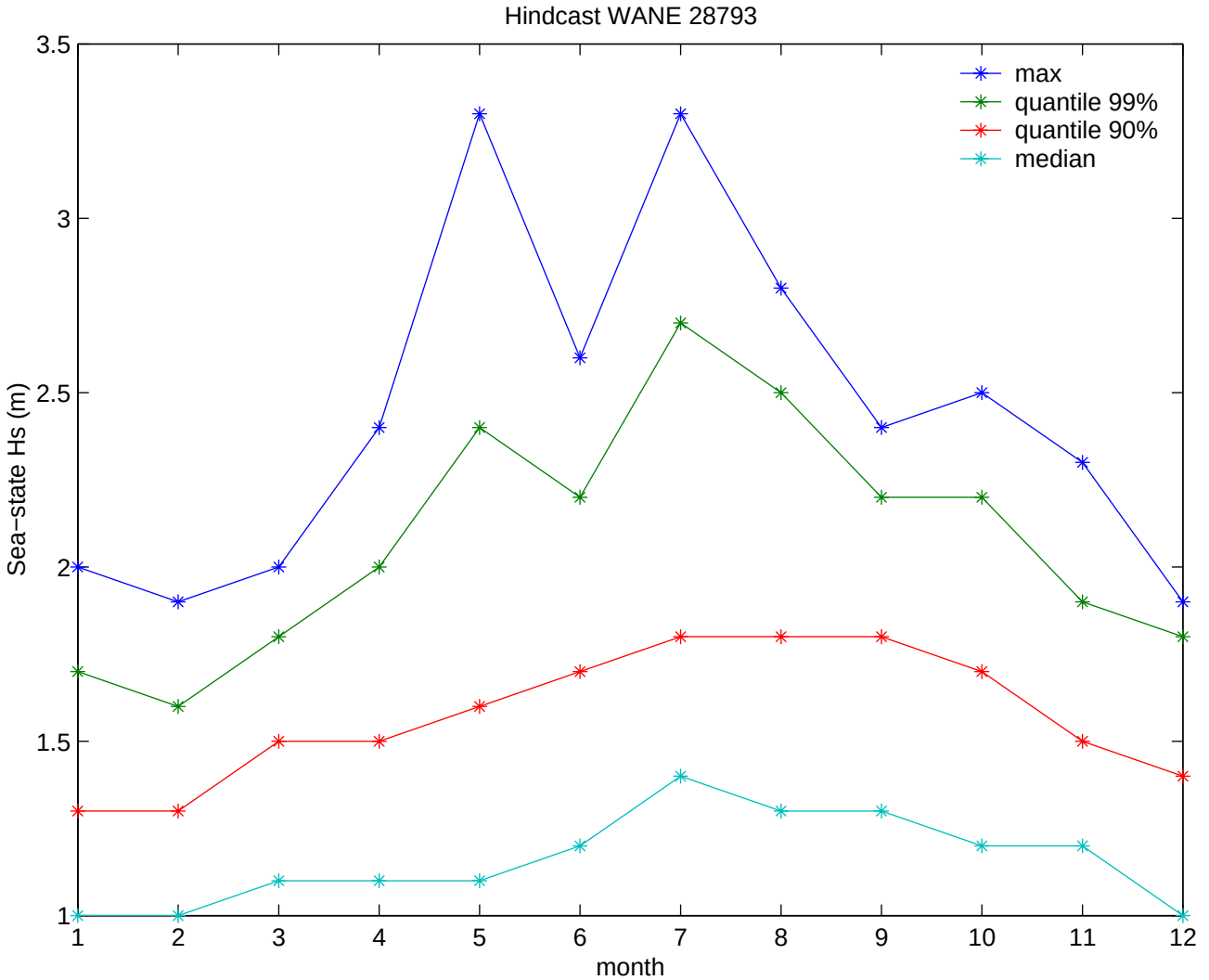

Hindcast WANE 25947
max
quantile 99%
quantile 90%
median
Sea−state Hs (m)
month
4
3.5
3
2.5
2
1.5
1
1
2
3
4
5
6
7
8
9
10
11
12

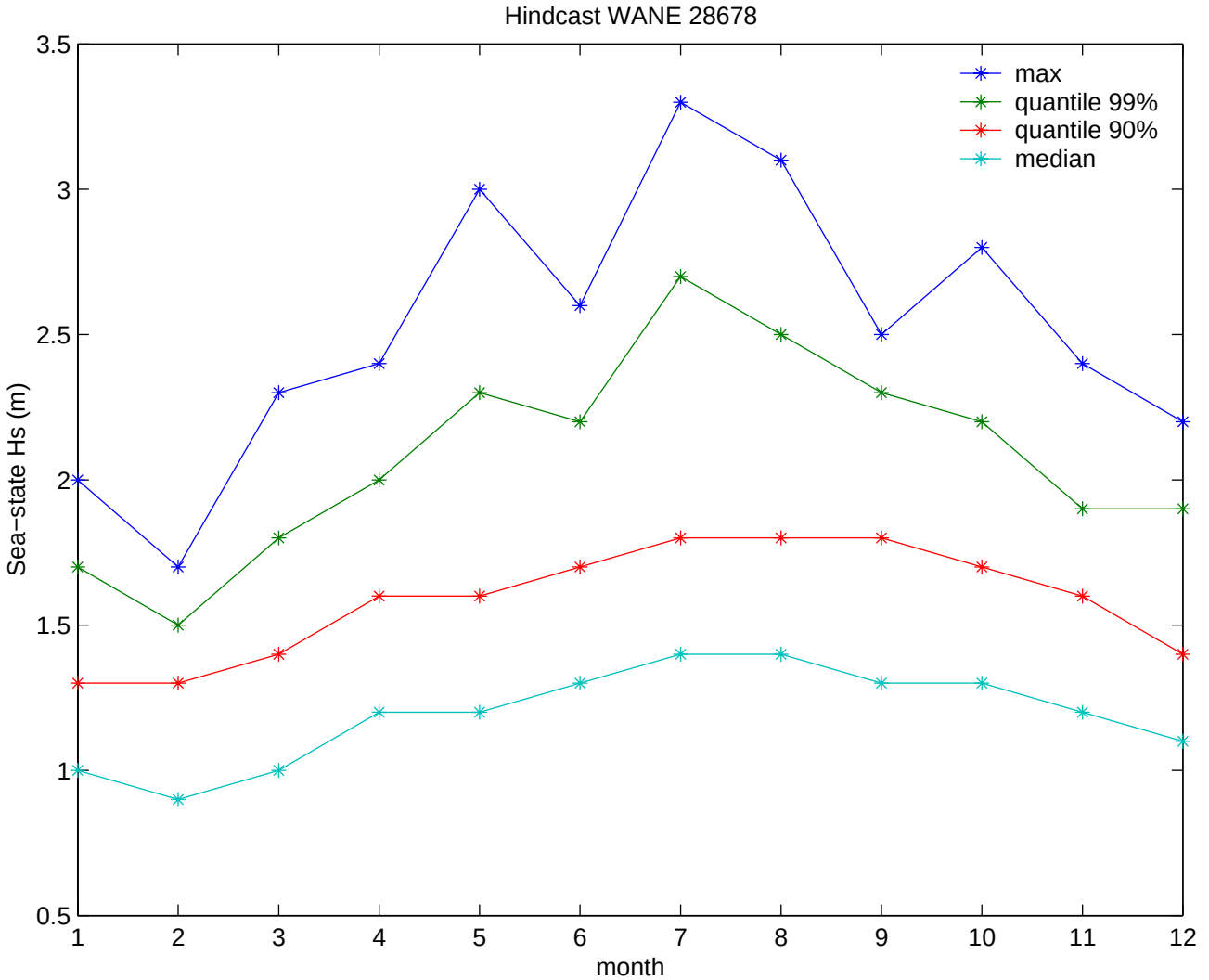

Hindcast WANE 26099
max
quantile 99%
quantile 90%
median
Sea−state Hs (m)
month
4
3.5
3
2.5
2
1.5
1
1
2
3
4
5
6
7
8
9
10
11
12


Hindcast WANE 27088
max
quantile 99%
quantile 90%
median
Sea−state Hs (m)
month
3.5
3
2.5
2
1.5
1
1
2
3
4
5
6
7
8
9
10
11
12


Hindcast WANE 28606
max
quantile 99%
quantile 90%
median
Sea−state Hs (m)
month
3.5
3
2.5
2
1.5
1
0.5
1
2
3
4
5
6
7
8
9
10
11
12


Hindcast WANE 28701
max
quantile 99%
quantile 90%
median
Sea−state Hs (m)
month
3.5
3
2.5
2
1.5
1
0.5
1
2
3
4
5
6
7
8
9
10
11
12

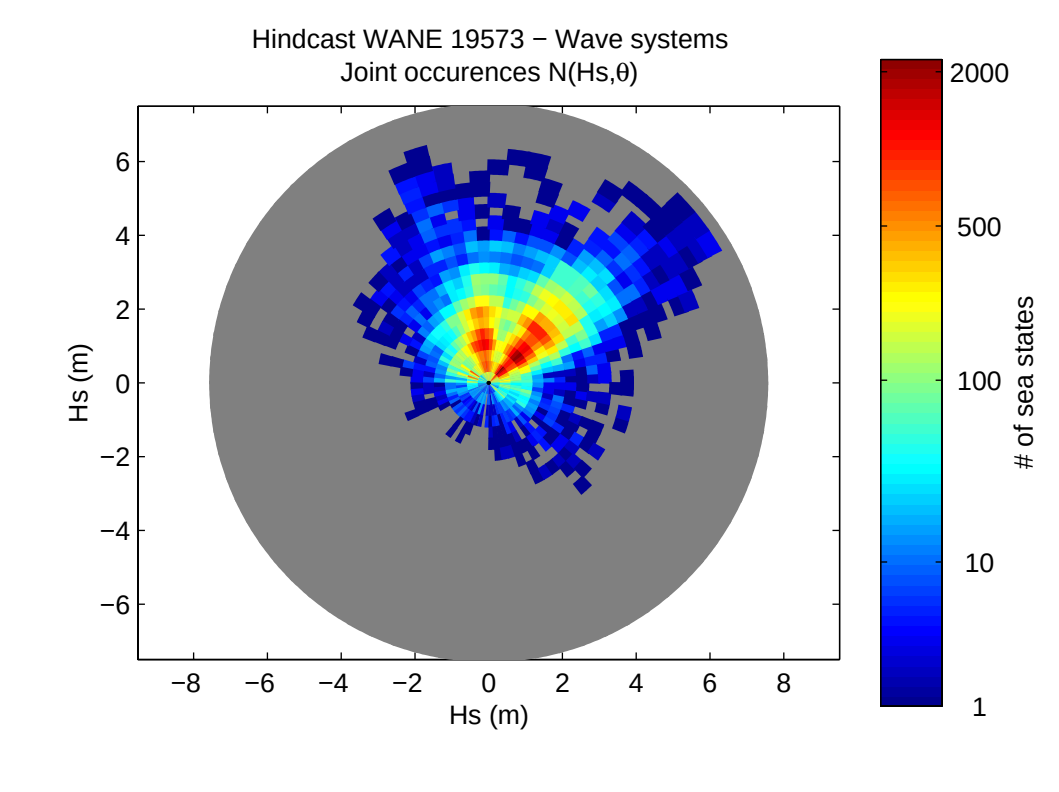

Hindcast WANE 28793
max
quantile 99%
quantile 90%
median
Sea−state Hs (m)
month
3.5
3
2.5
2
1.5
1
1
2
3
4
5
6
7
8
9
10
11
12

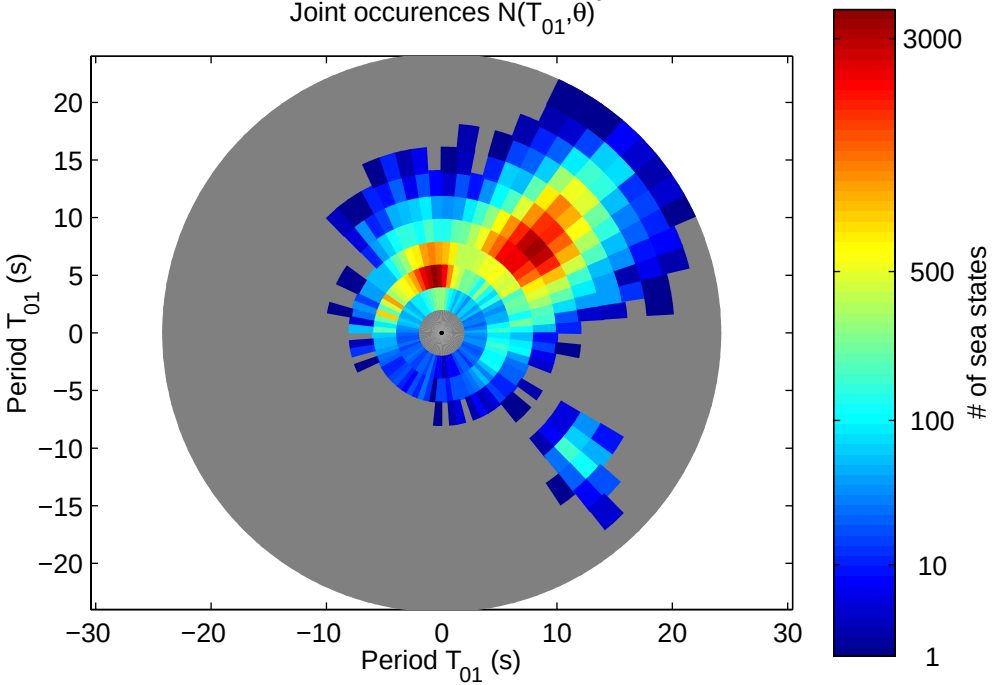

Hindcast WANE 28678
max
quantile 99%
quantile 90%
median
Sea−state Hs (m)
month
3.5
3
2.5
2
1.5
1
0.5
1
2
3
4
5
6
7
8
9
10
11
12

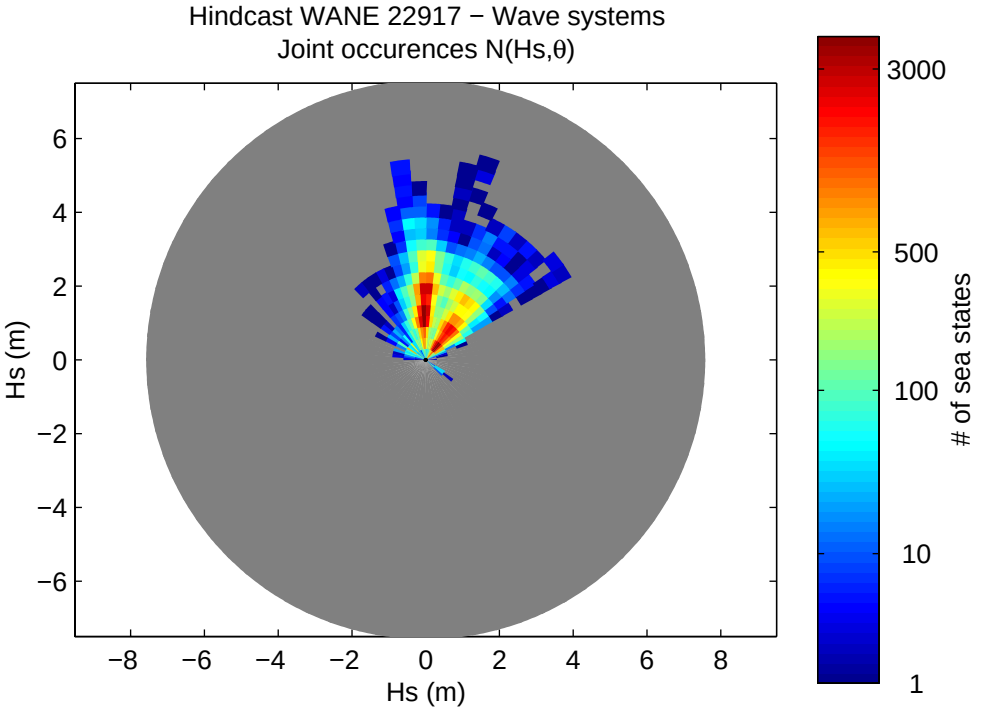
Appendix 3.2

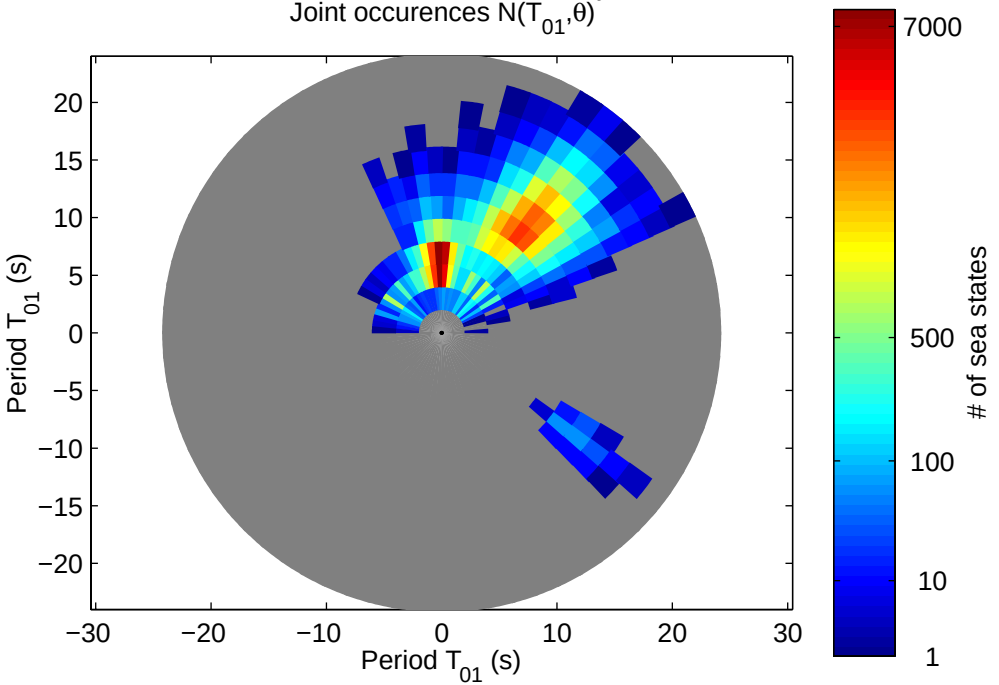
Wave systems, Hs-Dir & T01-Dir joint occurrence

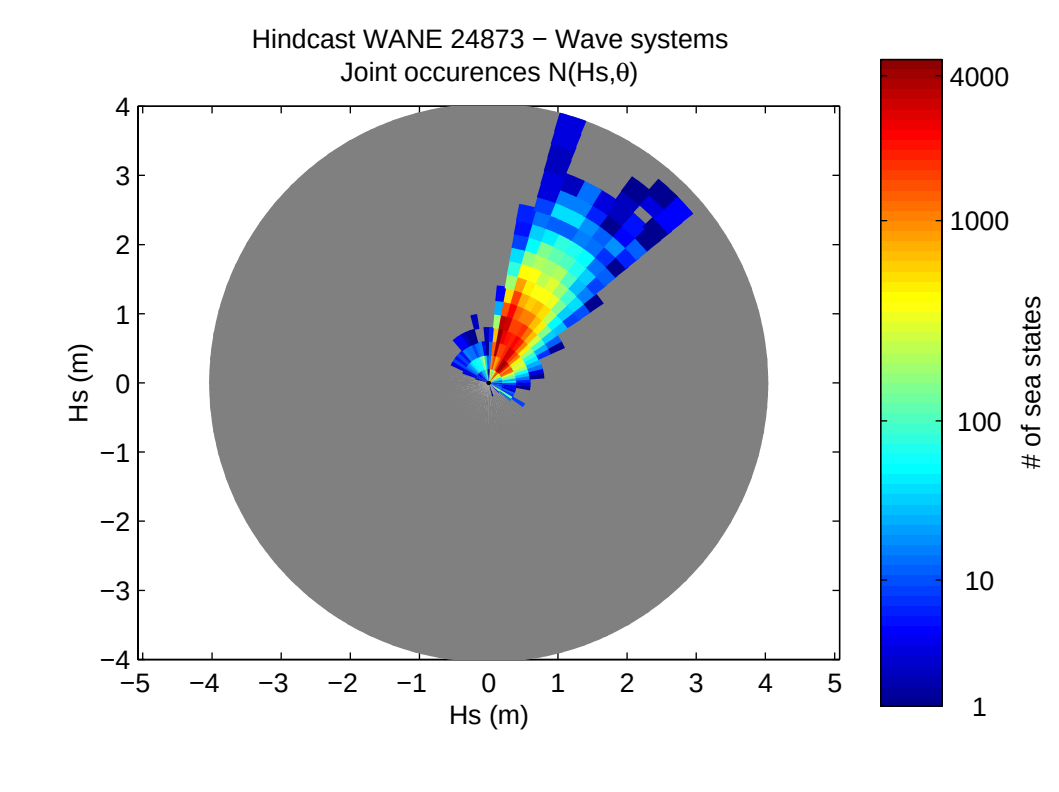
WANE Operational Data

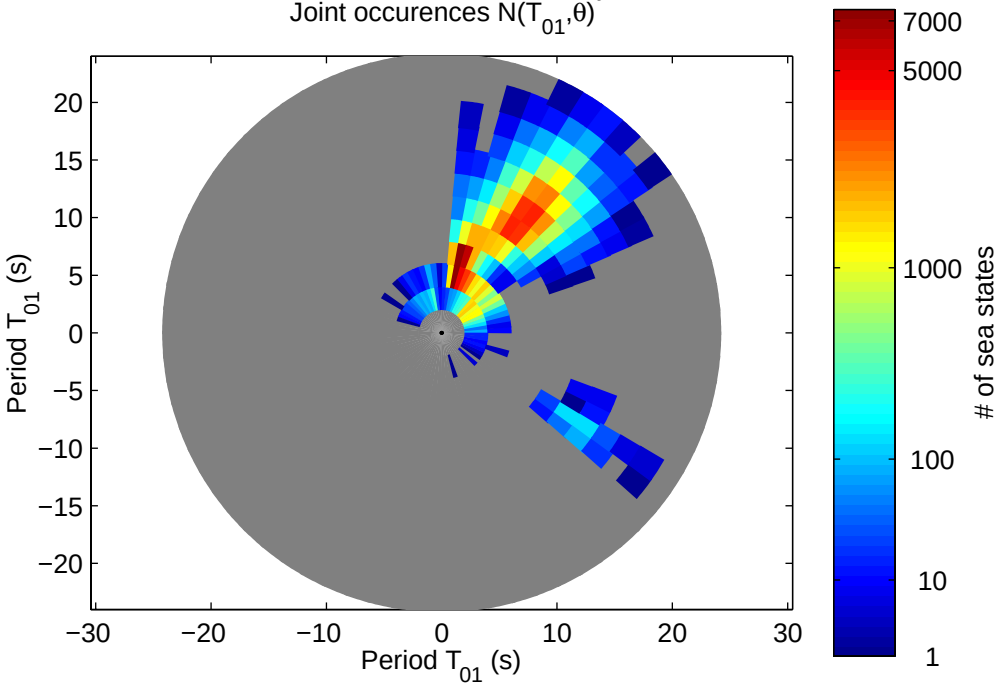

Hindcast WANE 19573 − Wave systems
Joint occurences N(Hs,θ)
Hs (m)
Hs (m)
# of sea states
2000
500
100
10
1
6
4
2
0
−2
−4
−6
−8
−6
−4
−2
0
2
4
6
8

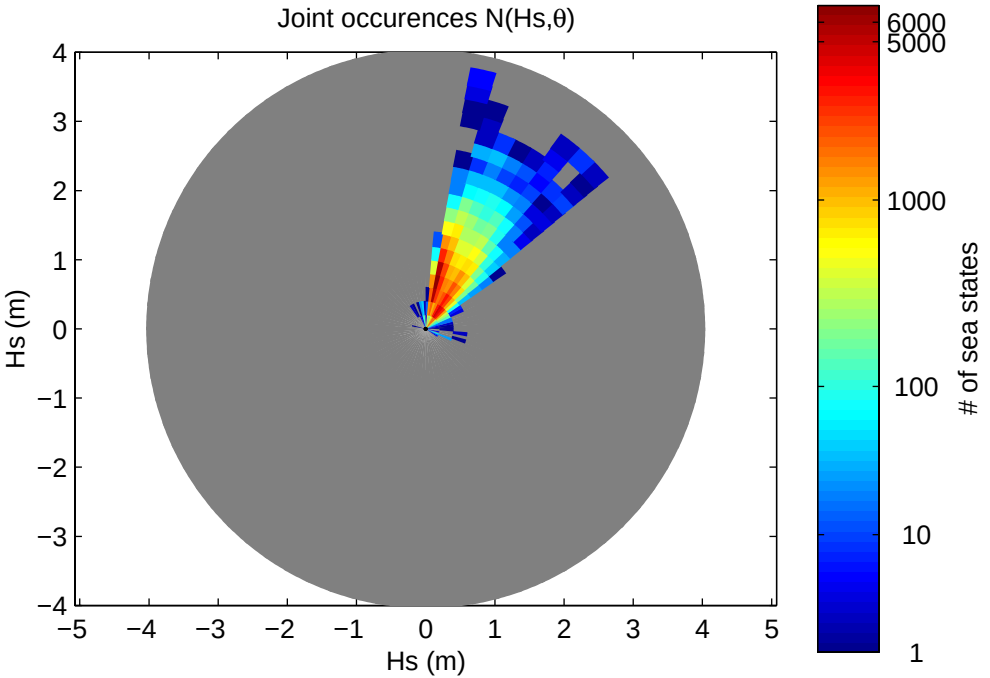

Hindcast WANE 19573 − Wave systems
Joint occurences N(T01,θ)
Period T01 (s)
Period T01 (s)
−30
−20
−10
0
10
20
30
20
15
10
5
0
−5
−10
−15
−20
# of sea states
3000
500
100
10
1

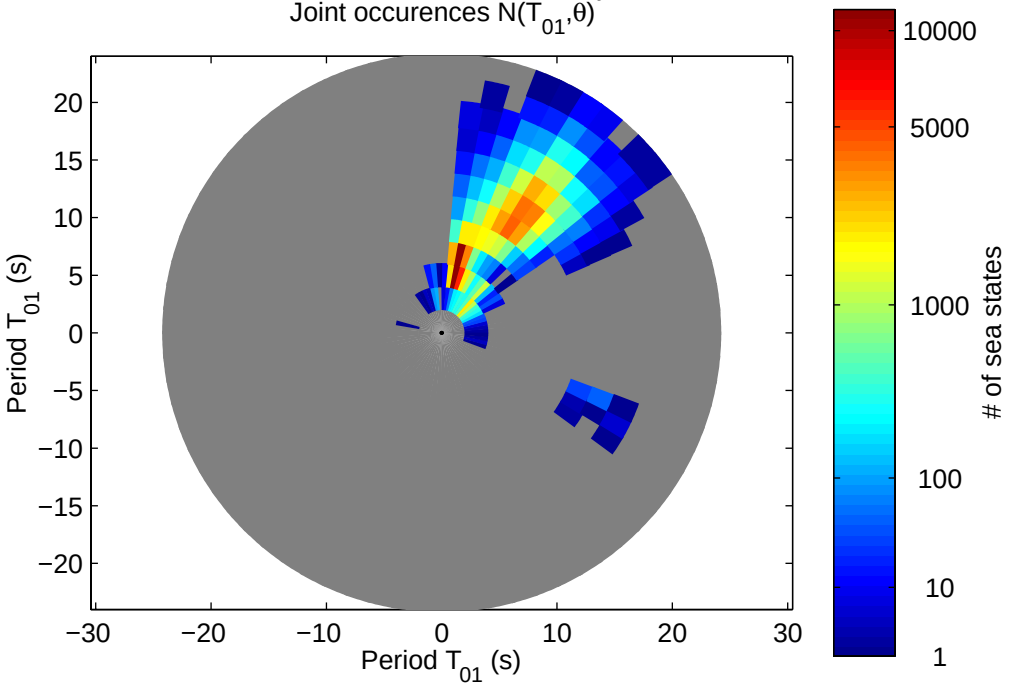

Hindcast WANE 22917 − Wave systems
Joint occurences N(Hs,θ)
Hs (m)
Hs (m)
6
4
2
0
−2
−4
−6
−8
−6
−4
−2
0
2
4
6
8
# of sea states
3000
500
100
10
1

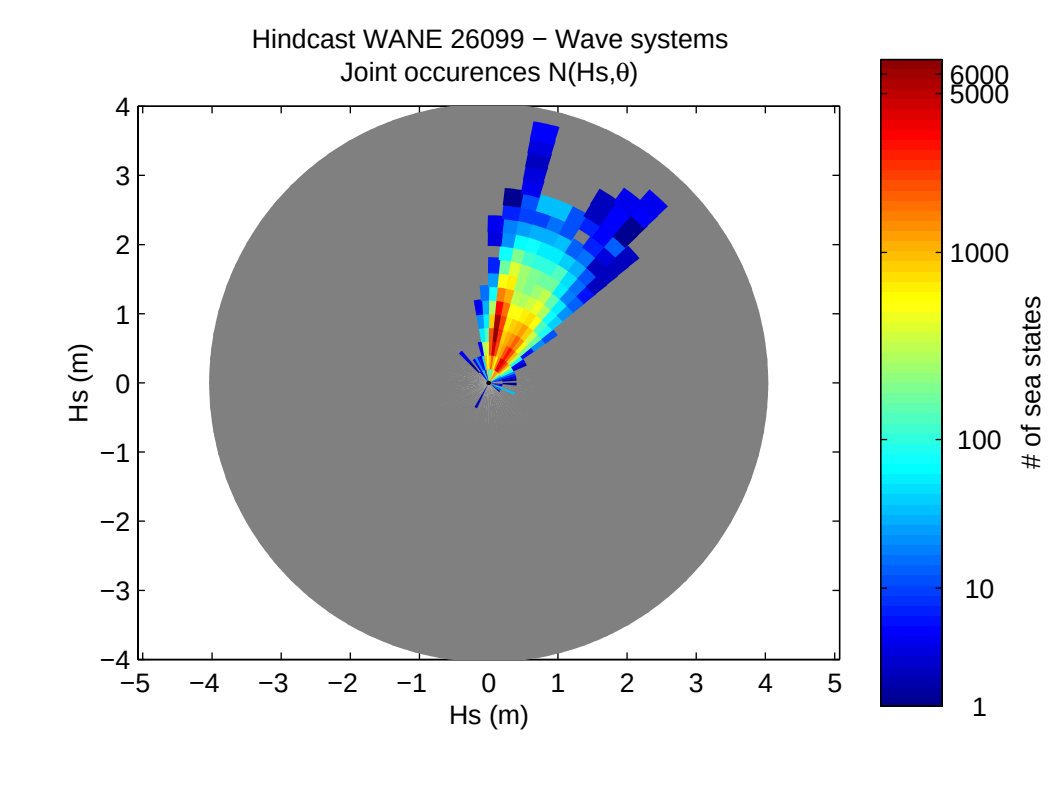

Hindcast WANE 22917 − Wave systems
Joint occurences N(T01,θ)
Period T01 (s)
Period T01 (s)
−30
−20
−10
0
10
20
30
20
15
10
5
0
−5
−10
−15
−20
7000
500
100
10
1
# of sea states

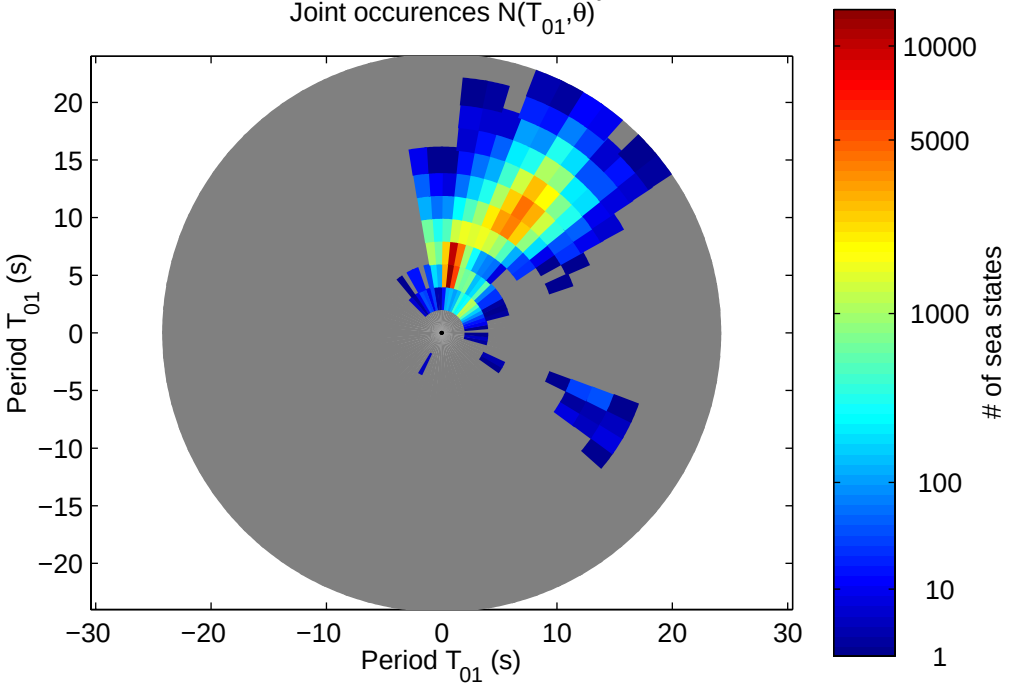

Hindcast WANE 24873 − Wave systems
Joint occurences N(Hs,θ)
Hs (m)
Hs (m)
# of sea states
4000
1000
100
10
1

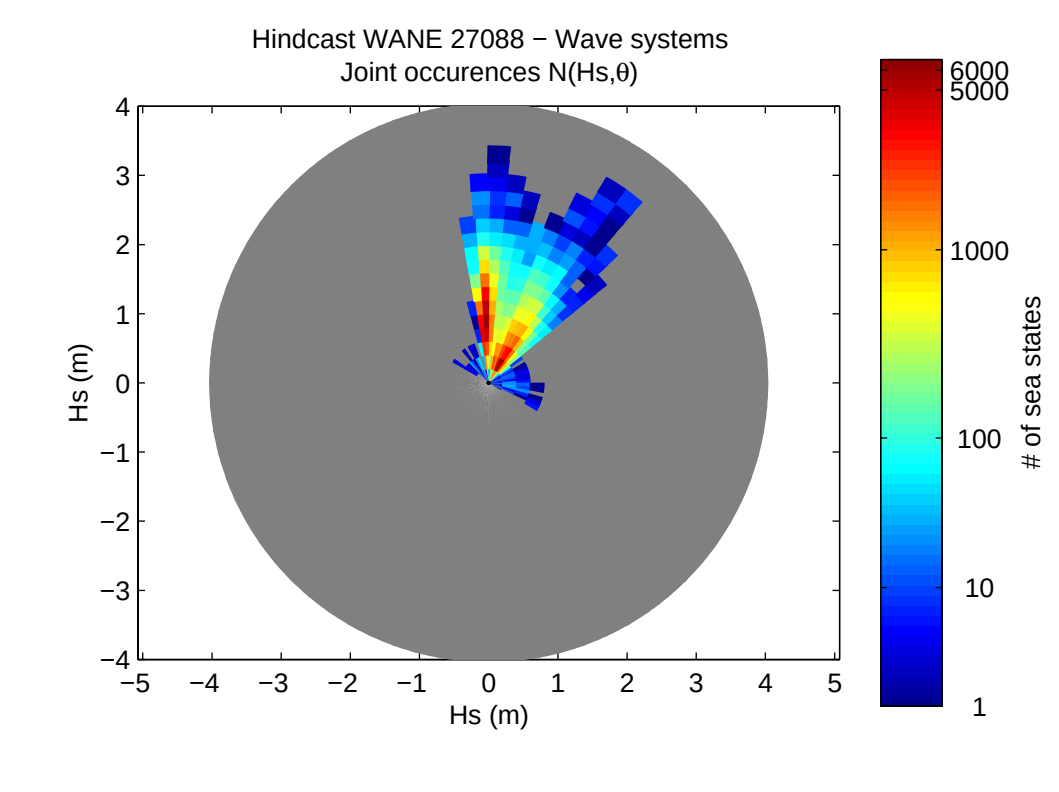

Hindcast WANE 24873 − Wave systems
Joint occurences N(T01,θ)
Period T01 (s)
Period T01 (s)
# of sea states
7000
5000
1000
100
10
1

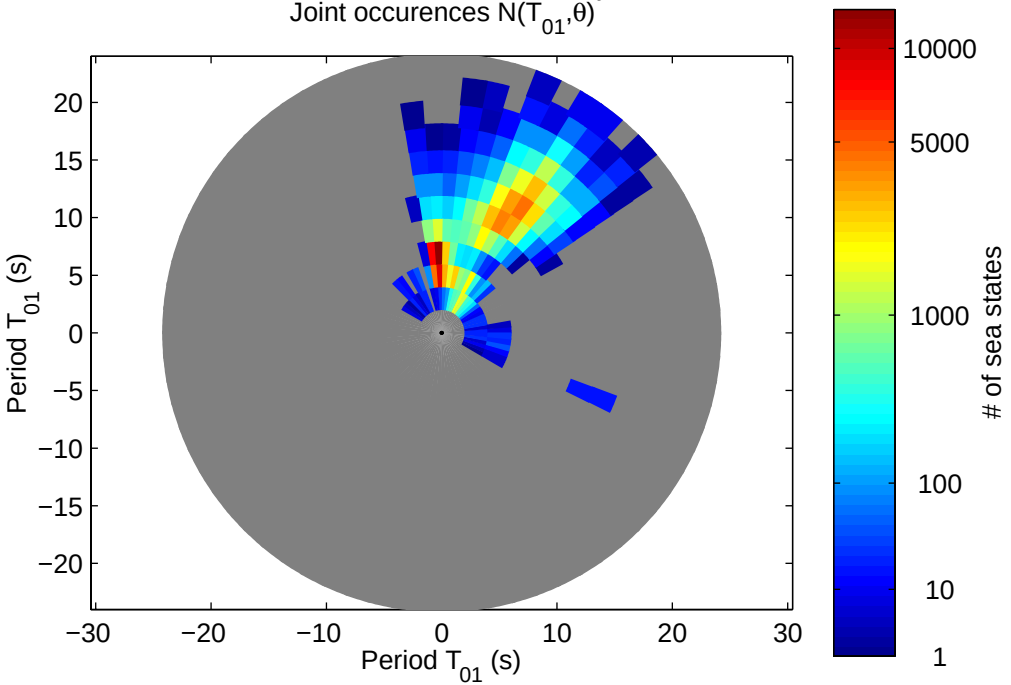

Hindcast WANE 25947 − Wave systems
Joint occurences N(Hs,θ)
Hs (m)
Hs (m)
# of sea states
6000
5000
1000
100
10
1
4
3
2
1
0
−1
−2
−3
−4
−5
−4
−3
−2
−1
0
1
2
3
4
5

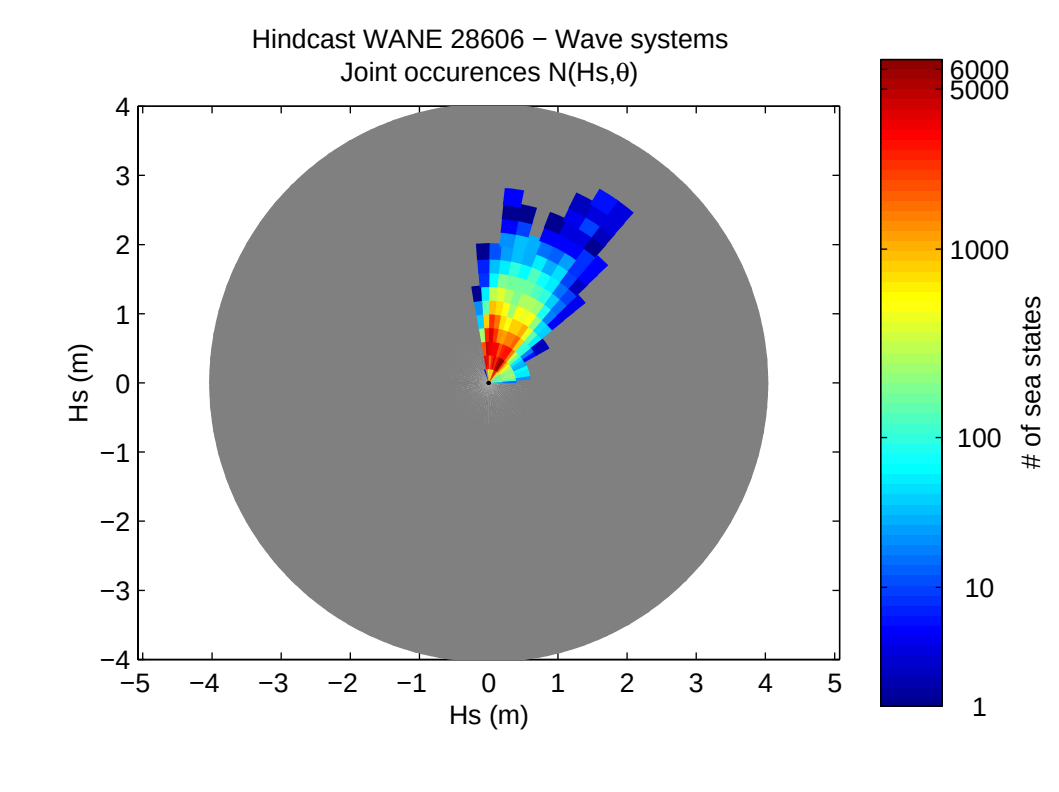

Hindcast WANE 25947 − Wave systems
Joint occurences N(T01,θ)
Period T01 (s)
Period T01 (s)
−30
−20
−10
0
10
20
30
20
15
10
5
0
−5
−10
−15
−20
# of sea states
10000
5000
1000
100
10
1

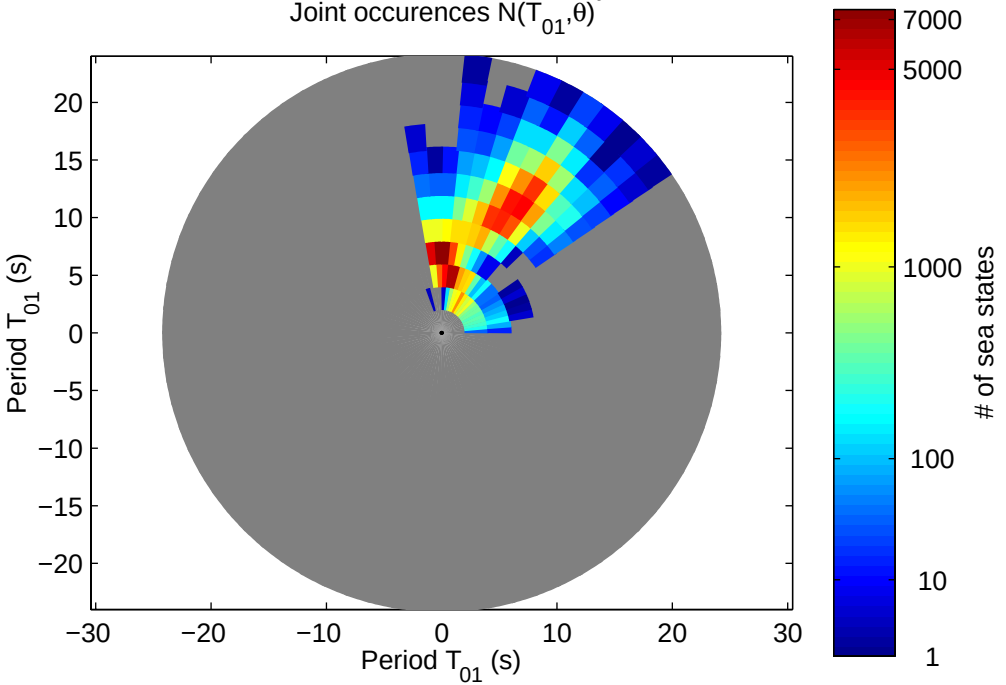

Hindcast WANE 26099 − Wave systems
Joint occurences N(Hs,θ)
Hs (m)
Hs (m)
# of sea states
6000
5000
1000
100
10
1

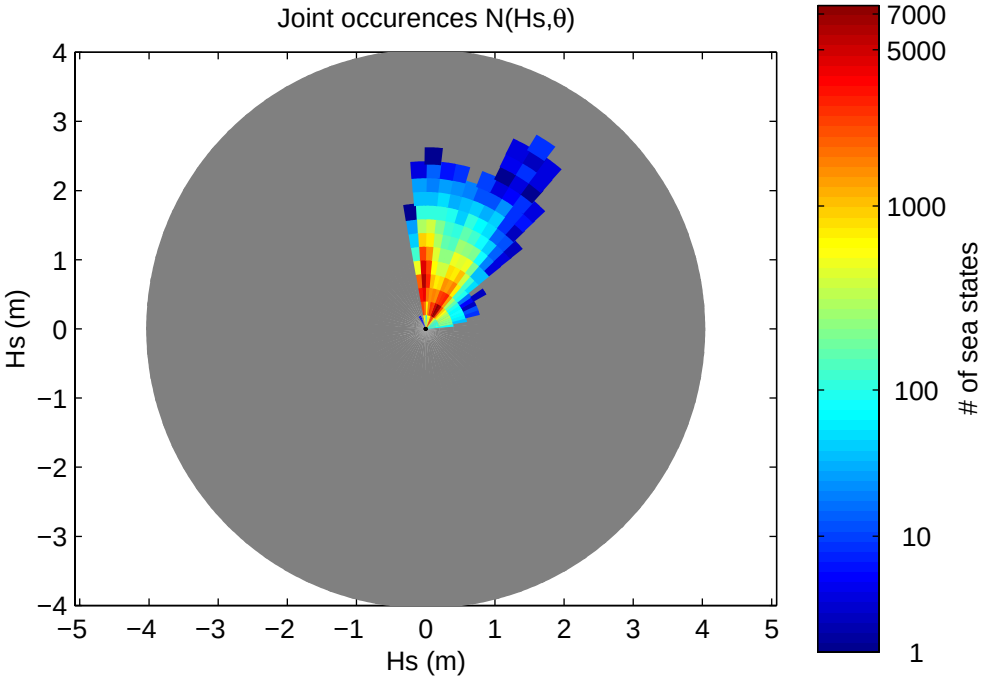

Hindcast WANE 26099 − Wave systems
Joint occurences N(T01,θ)
Period T01 (s)
Period T01 (s)
# of sea states
20
15
10
5
0
−5
−10
−15
−20
−30
−20
−10
0
10
20
30
10000
5000
1000
100
10
1

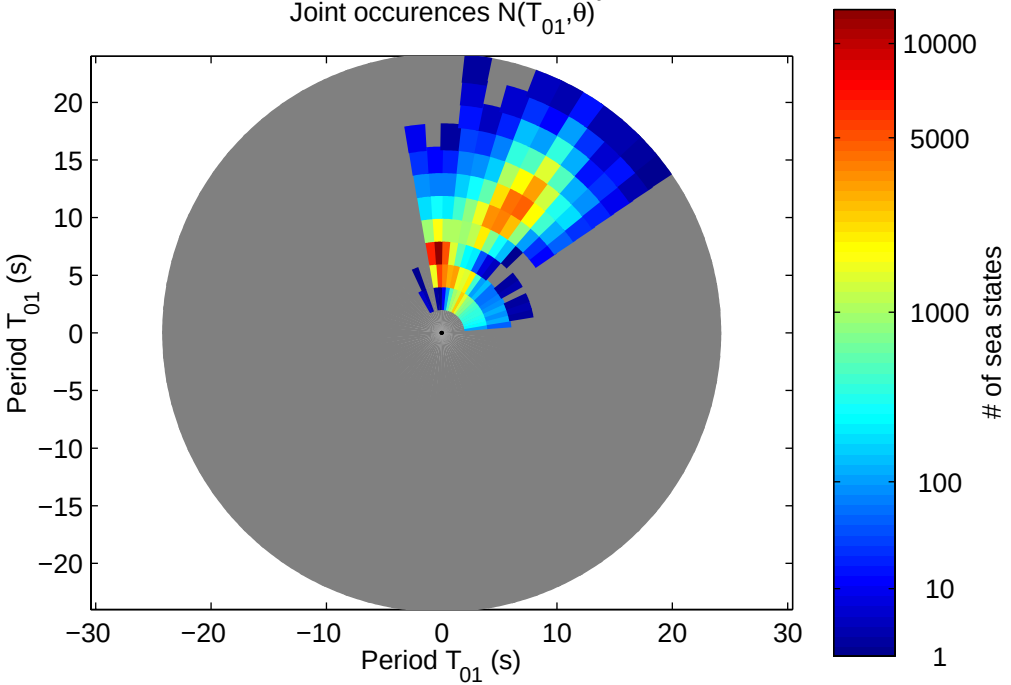

Hindcast WANE 27088 − Wave systems
Joint occurences N(Hs,θ)
Hs (m)
Hs (m)
# of sea states
6000
5000
1000
100
10
1
4
3
2
1
0
−1
−2
−3
−4
−5
−4
−3
−2
−1
0
1
2
3
4
5

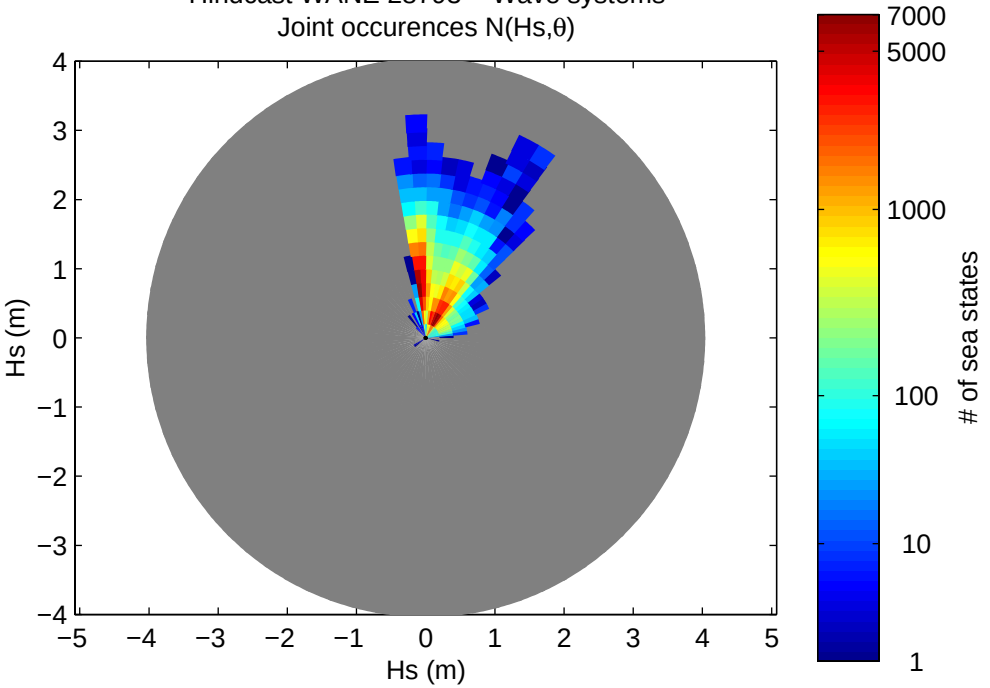

Hindcast WANE 27088 − Wave systems
Joint occurences N(T01,θ)
Period T01 (s)
Period T01 (s)
# of sea states
20
15
10
5
0
−5
−10
−15
−20
−30
−20
−10
0
10
20
30
10000
5000
1000
100
10
1

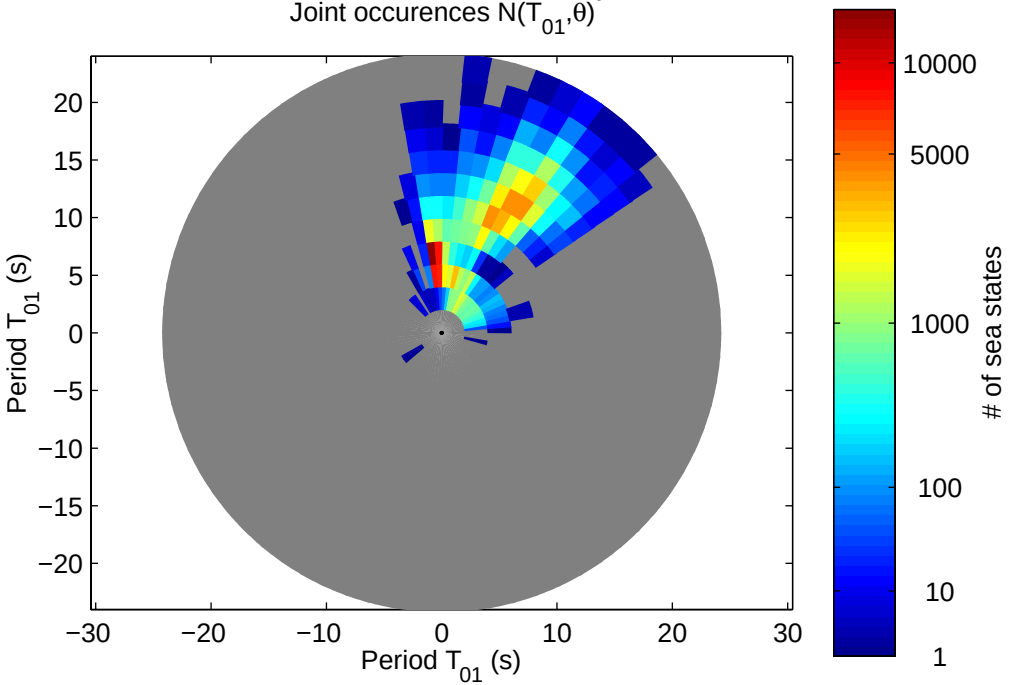

Hindcast WANE 28606 − Wave systems
Joint occurences N(Hs,θ)
Hs (m)
Hs (m)
# of sea states
6000
5000
1000
100
10
1

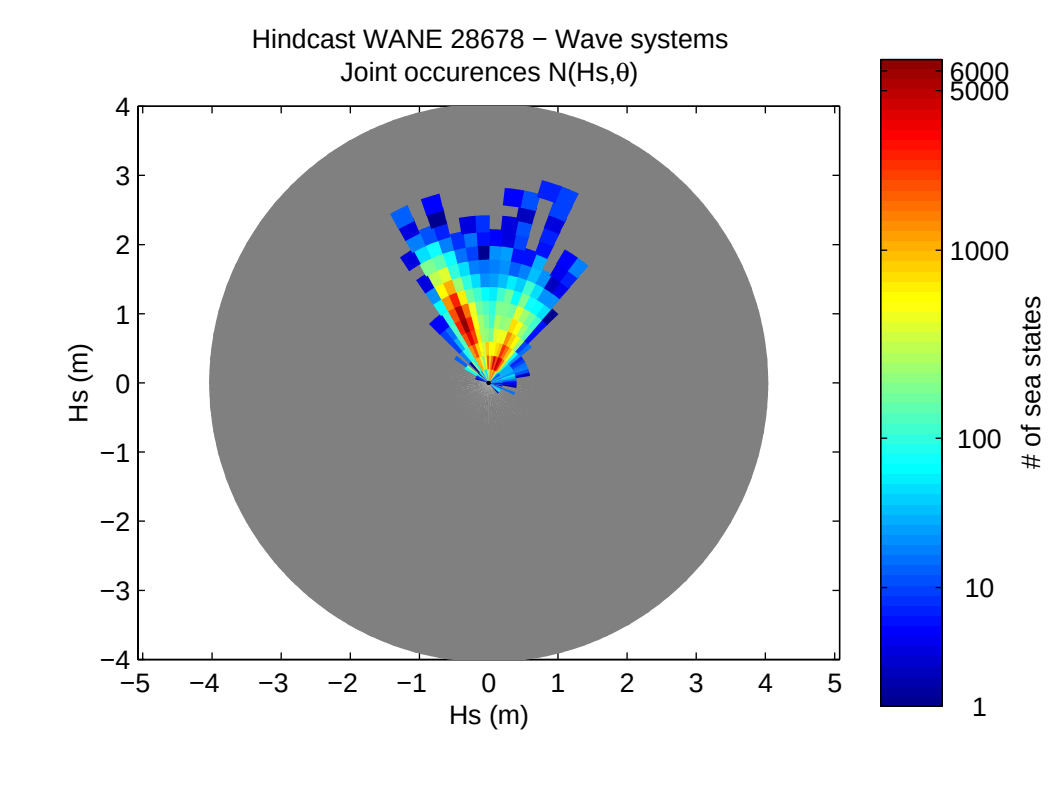

Hindcast WANE 28606 − Wave systems
Joint occurences N(T01,θ)
Period T01 (s)
Period T01 (s)
# of sea states
7000
5000
1000
100
10
1

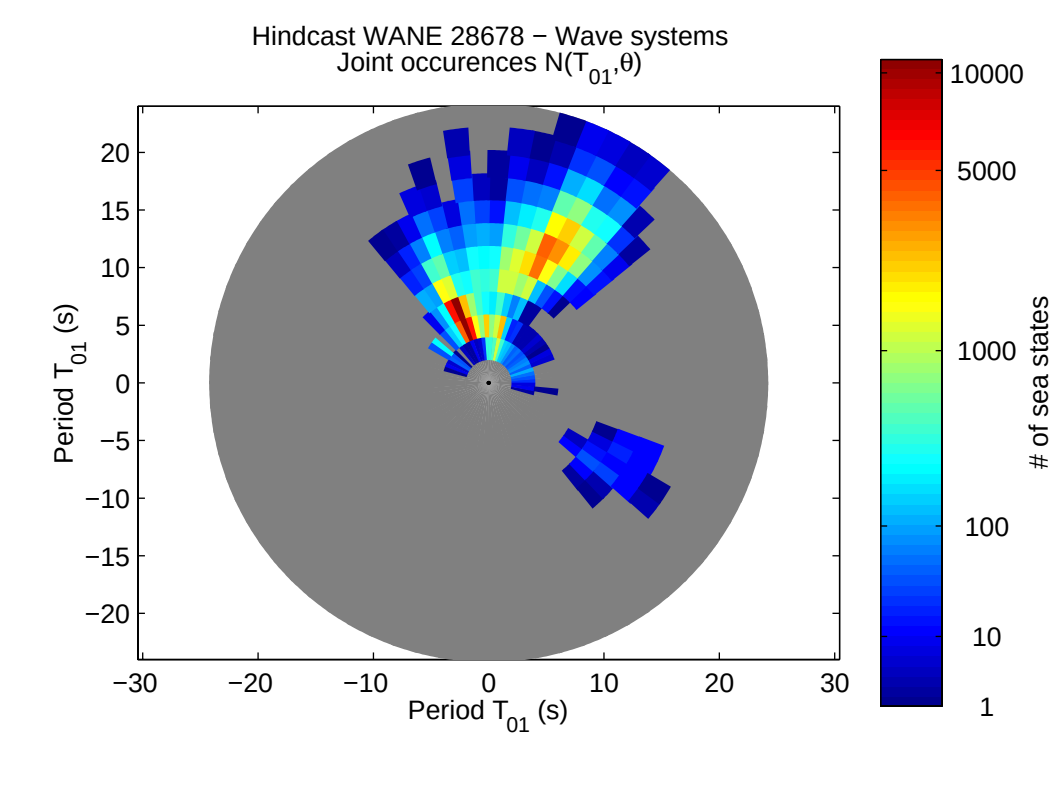

Hindcast WANE 28701 − Wave systems
Joint occurences N(Hs,θ)
Hs (m)
Hs (m)
# of sea states
7000
5000
1000
100
10
1
4
3
2
1
0
−1
−2
−3
−4
−5
−4
−3
−2
−1
0
1
2
3
4
5


Hindcast WANE 28701 − Wave systems
Joint occurences N(T01,θ)
Period T01 (s)
Period T01 (s)
# of sea states
10000
5000
1000
100
10
1
20
15
10
5
0
−5
−10
−15
−20
−30
−20
−10
0
10
20
30


Hindcast WANE 28793 − Wave systems
Joint occurences N(Hs,θ)
Hs (m)
Hs (m)
# of sea states
7000
5000
1000
100
10
1
4
3
2
1
0
−1
−2
−3
−4
−5
−4
−3
−2
−1
0
1
2
3
4
5


Hindcast WANE 28793 − Wave systems
Joint occurences N(T01,θ)
Period T01 (s)
Period T01 (s)
20
15
10
5
0
−5
−10
−15
−20
−30
−20
−10
0
10
20
30
10000
5000
1000
100
10
1
# of sea states

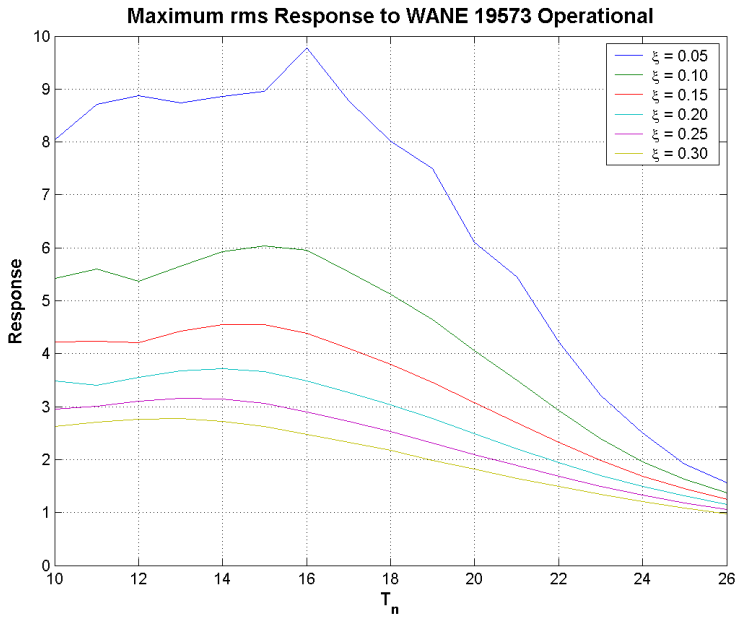

Hindcast WANE 28678 − Wave systems
Joint occurences N(Hs,θ)
Hs (m)
Hs (m)
# of sea states
6000
5000
1000
100
10
1
4
3
2
1
0
−1
−2
−3
−4
−5
−4
−3
−2
−1
0
1
2
3
4
5

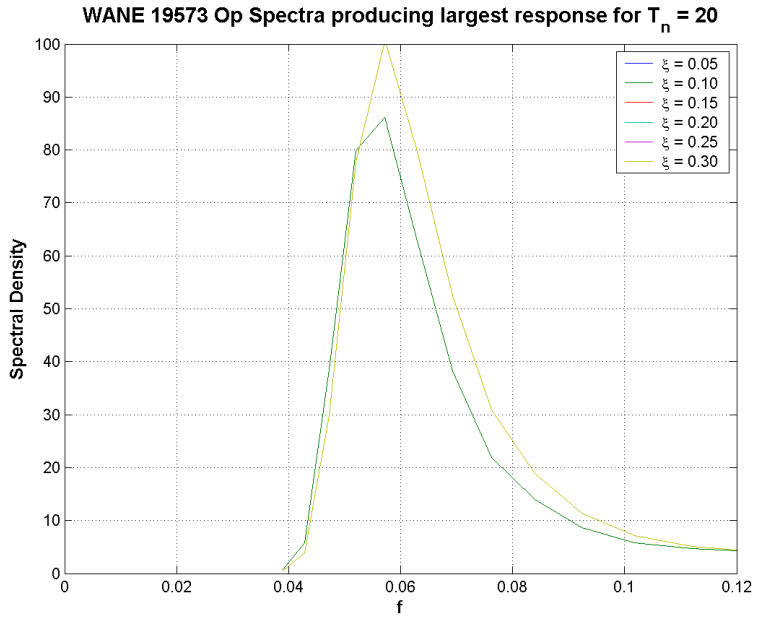

Hindcast WANE 28678 − Wave systems
Joint occurences N(T01,θ)
Period T01 (s)
Period T01 (s)
−30
−20
−10
0
10
20
30
20
15
10
5
0
−5
−10
−15
−20
# of sea states
10000
5000
1000
100
10
1

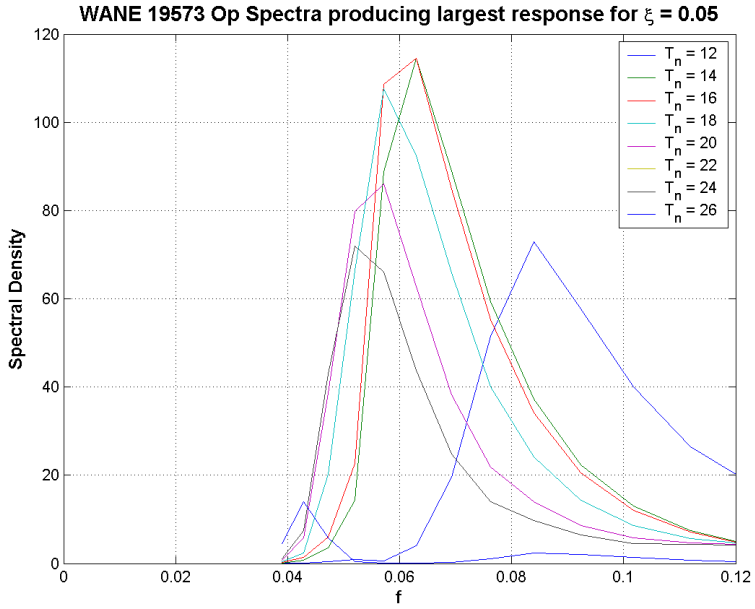
Appendix 7.1

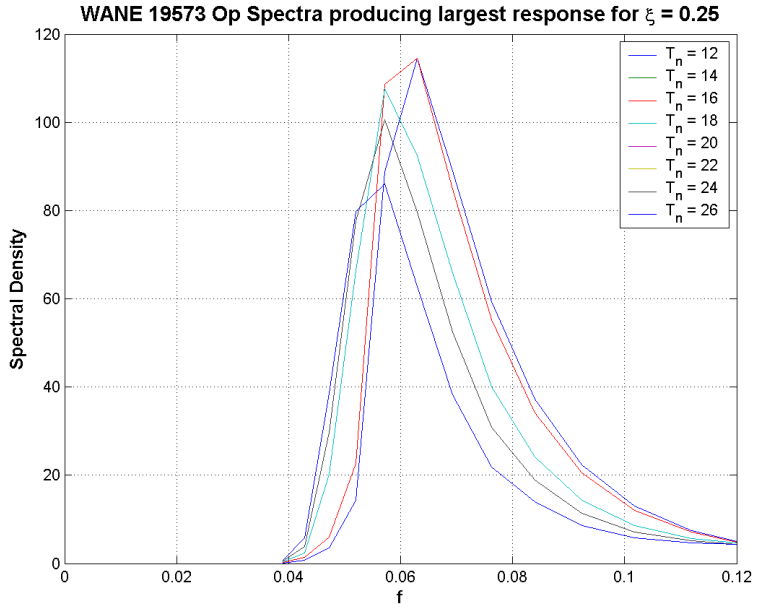
Maximum rms Responses and Associated Spectra

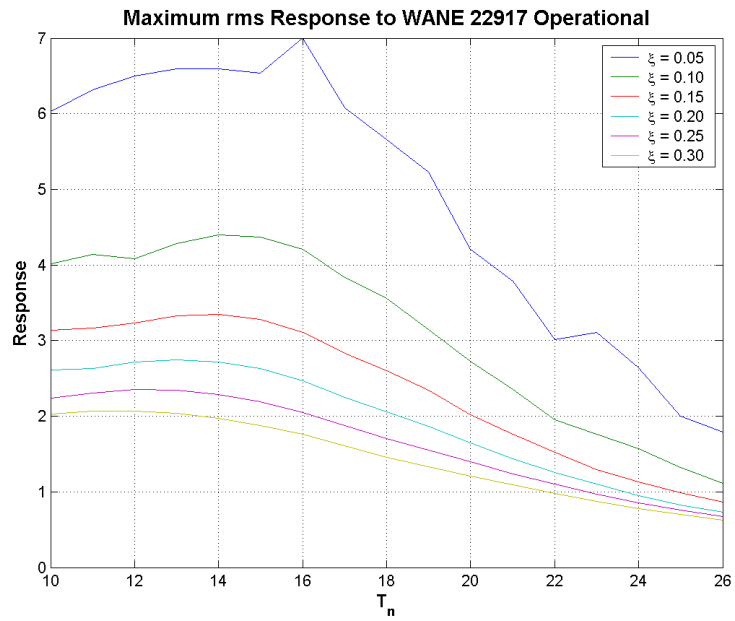
WANE Operational Data

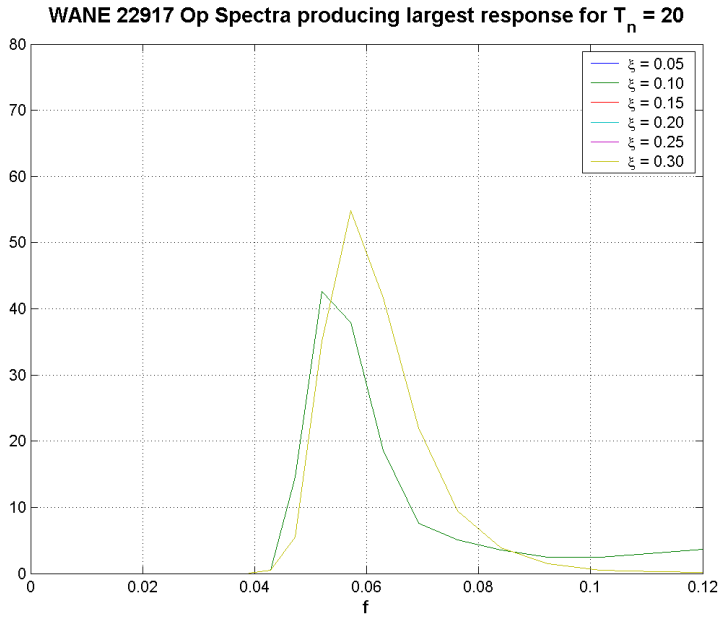

Maximum rms Response to WANE 19573 Operational
Response
T_n
ξ = 0.05
ξ = 0.10
ξ = 0.15
ξ = 0.20
ξ = 0.25
ξ = 0.30

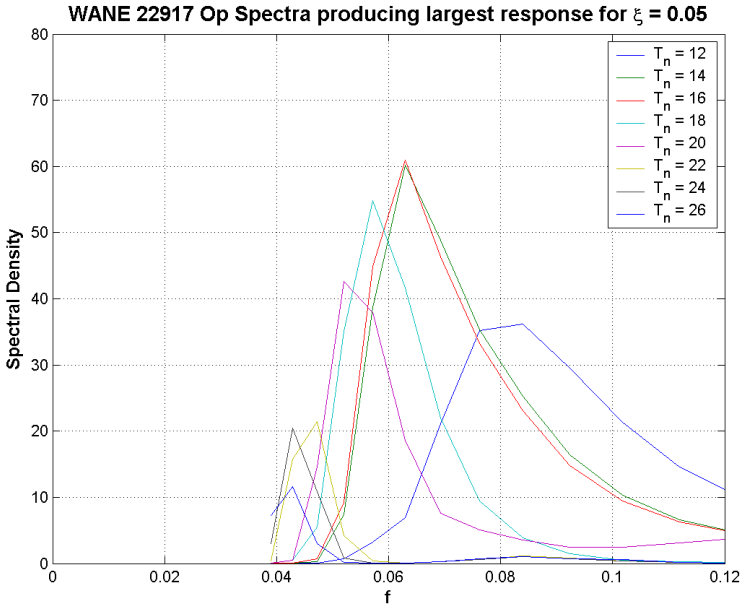

WANE 19573 Op Spectra producing largest response for T_n = 20
Spectral Density
f
ξ = 0.05
ξ = 0.10
ξ = 0.15
ξ = 0.20
ξ = 0.25
ξ = 0.30

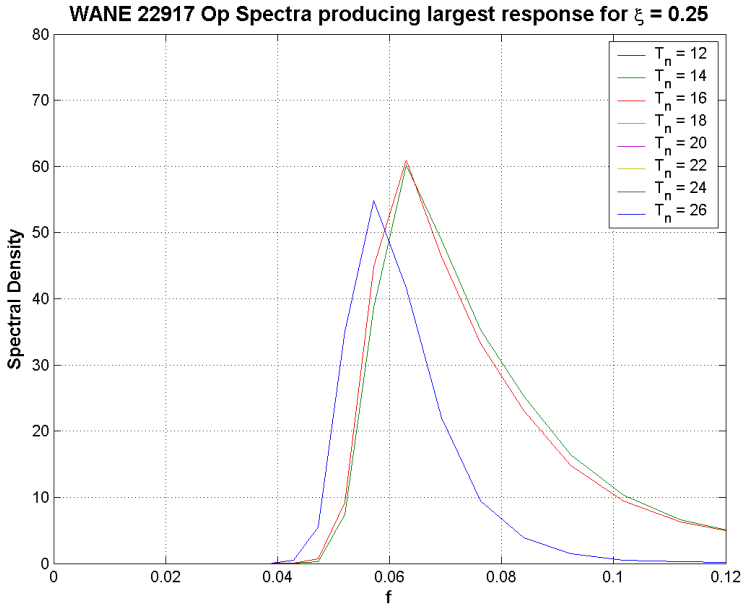

WANE 19573 Op Spectra producing largest response for ξ = 0.05
Spectral Density
f
T_n = 12
T_n = 14
T_n = 16
T_n = 18
T_n = 20
T_n = 22
T_n = 24
T_n = 26

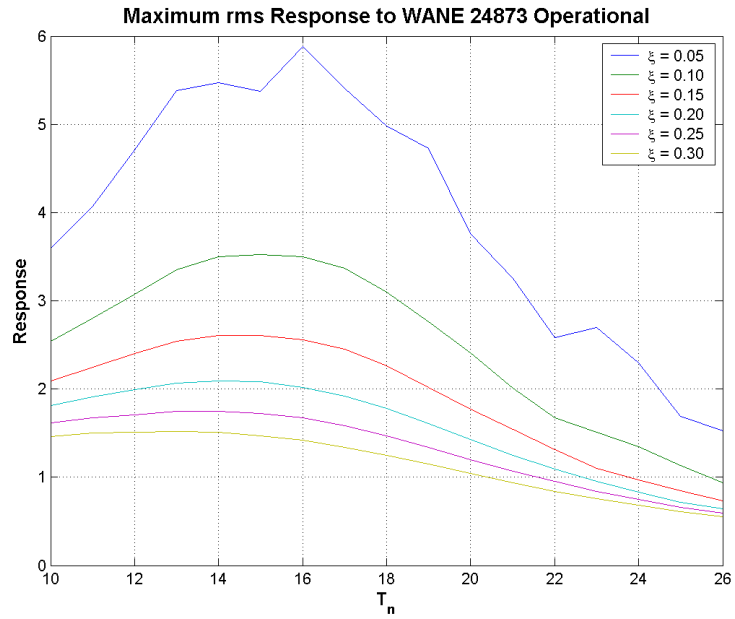

WANE 19573 Op Spectra producing largest response for ξ = 0.25
Spectral Density
f
T_n = 12
T_n = 14
T_n = 16
T_n = 18
T_n = 20
T_n = 22
T_n = 24
T_n = 26

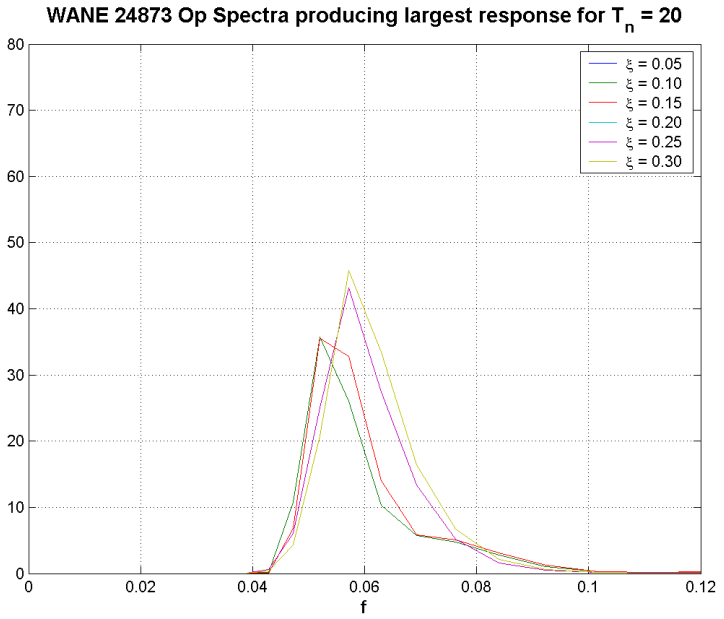

Maximum rms Response to WANE 22917 Operational
Response
T_n
ξ = 0.05
ξ = 0.10
ξ = 0.15
ξ = 0.20
ξ = 0.25
ξ = 0.30

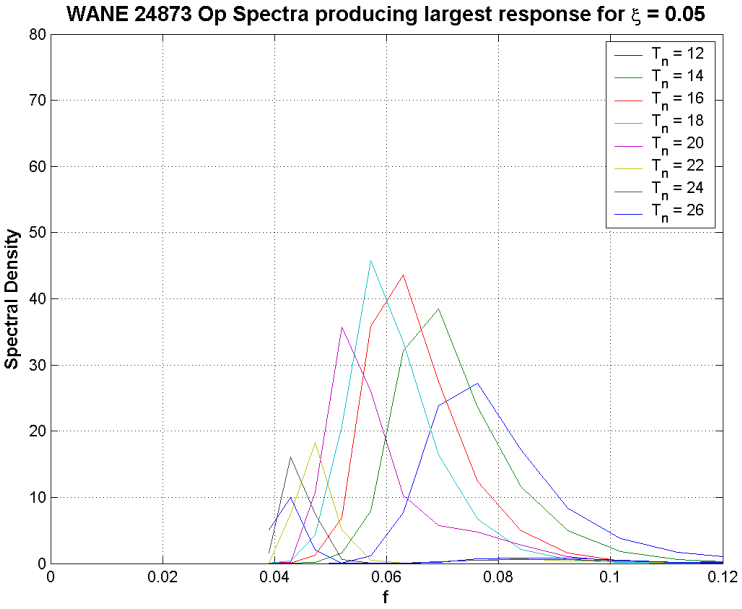

WANE 22917 Op Spectra producing largest response for T_n = 20
f
ξ = 0.05
ξ = 0.10
ξ = 0.15
ξ = 0.20
ξ = 0.25
ξ = 0.30

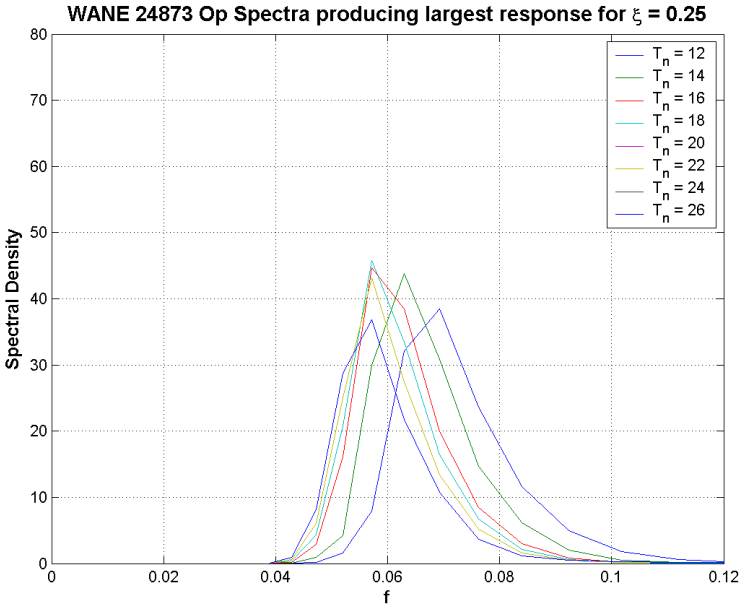

WANE 22917 Op Spectra producing largest response for ξ = 0.05
Spectral Density
f
T_n = 12
T_n = 14
T_n = 16
T_n = 18
T_n = 20
T_n = 22
T_n = 24
T_n = 26

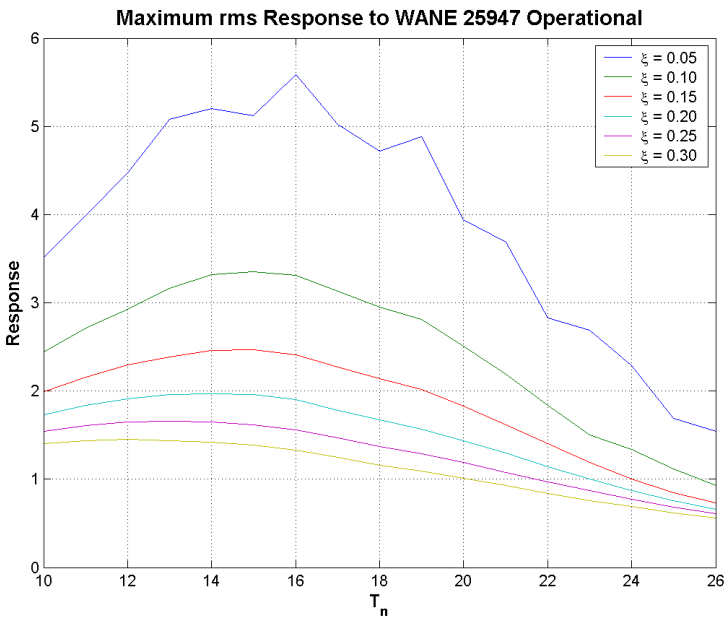

WANE 22917 Op Spectra producing largest response for ξ = 0.25
Spectral Density
f
T_n = 12
T_n = 14
T_n = 16
T_n = 18
T_n = 20
T_n = 22
T_n = 24
T_n = 26

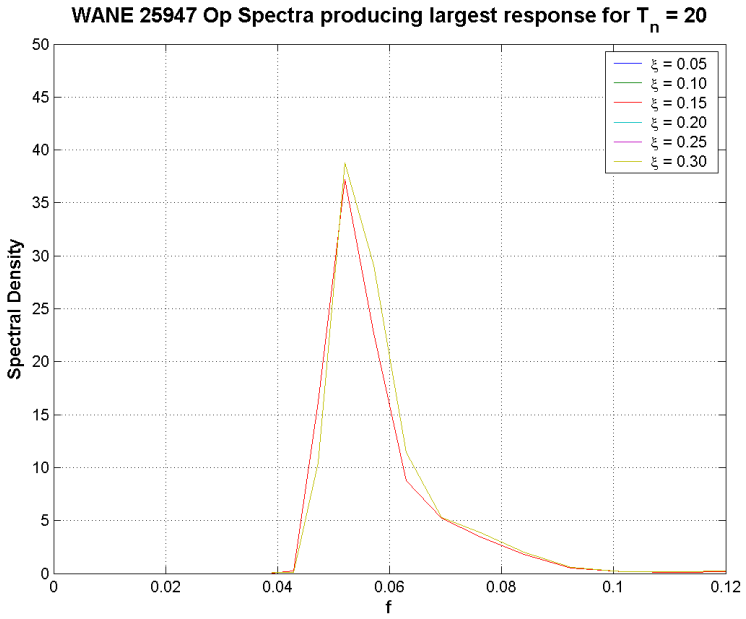

Maximum rms Response to WANE 24873 Operational
Response
T_n
ξ = 0.05
ξ = 0.10
ξ = 0.15
ξ = 0.20
ξ = 0.25
ξ = 0.30

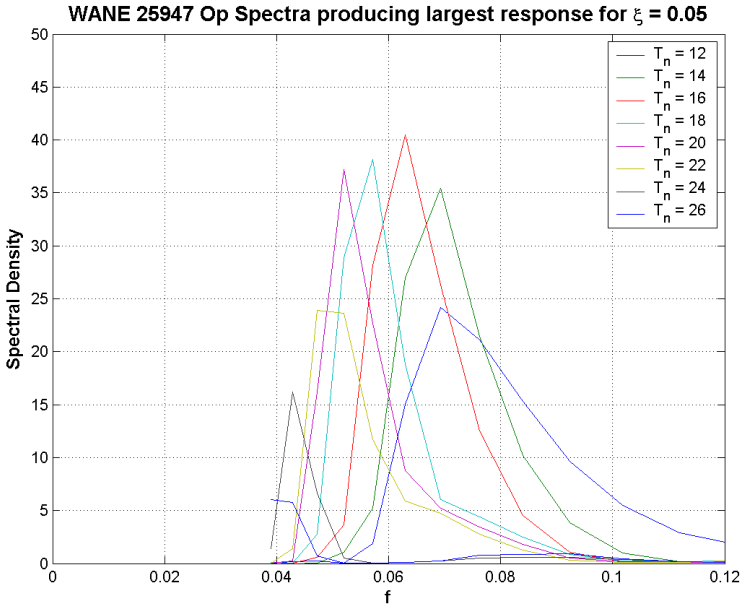

WANE 24873 Op Spectra producing largest response for T_n = 20
f
ξ = 0.05
ξ = 0.10
ξ = 0.15
ξ = 0.20
ξ = 0.25
ξ = 0.30

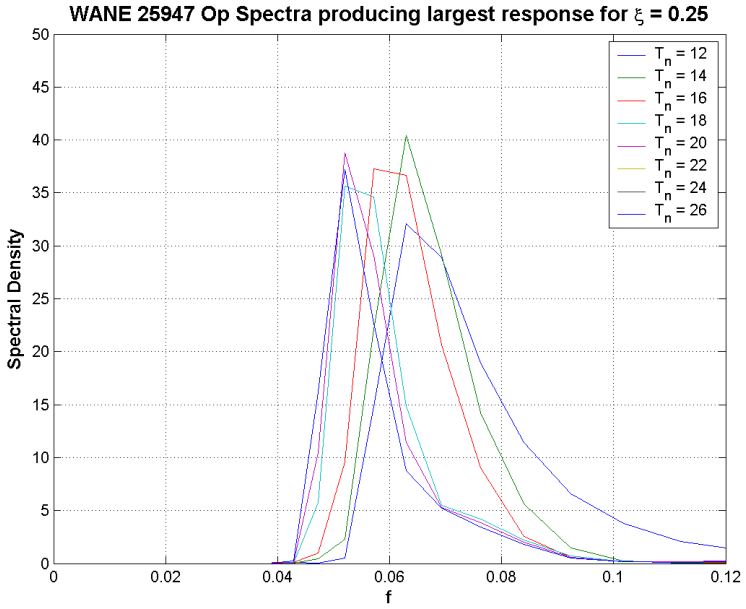

WANE 24873 Op Spectra producing largest response for ξ = 0.05
Spectral Density
f
T_n = 12
T_n = 14
T_n = 16
T_n = 18
T_n = 20
T_n = 22
T_n = 24
T_n = 26

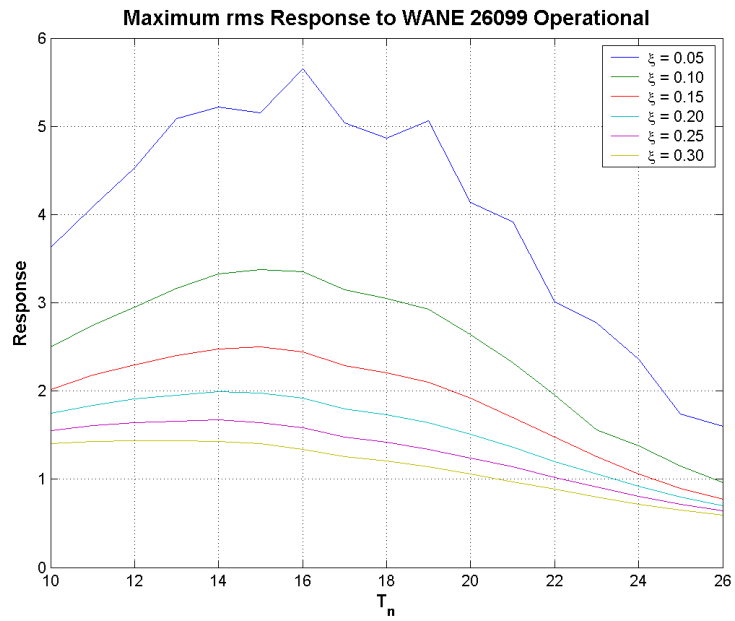

WANE 24873 Op Spectra producing largest response for ξ = 0.25
Spectral Density
f
T_n = 12
T_n = 14
T_n = 16
T_n = 18
T_n = 20
T_n = 22
T_n = 24
T_n = 26

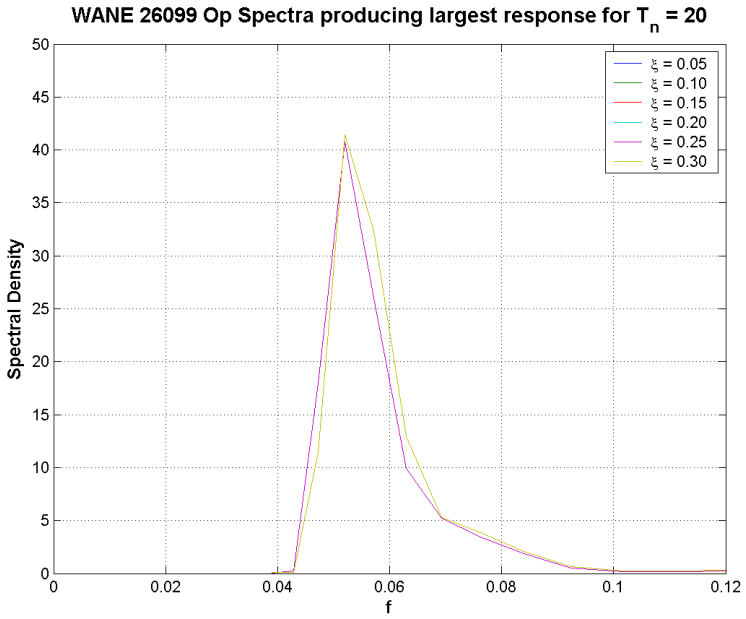

Maximum rms Response to WANE 25947 Operational
Response
T_n
ξ = 0.05
ξ = 0.10
ξ = 0.15
ξ = 0.20
ξ = 0.25
ξ = 0.30

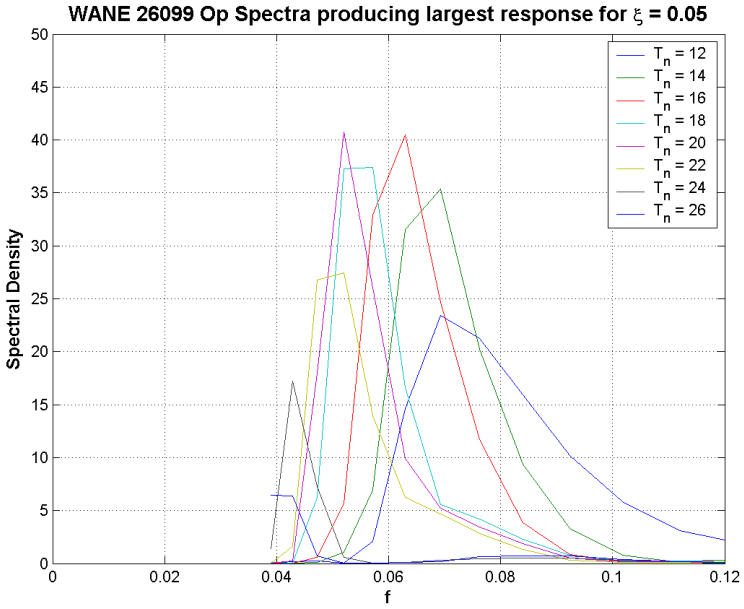

WANE 25947 Op Spectra producing largest response for T_n = 20
Spectral Density
f
ξ = 0.05
ξ = 0.10
ξ = 0.15
ξ = 0.20
ξ = 0.25
ξ = 0.30

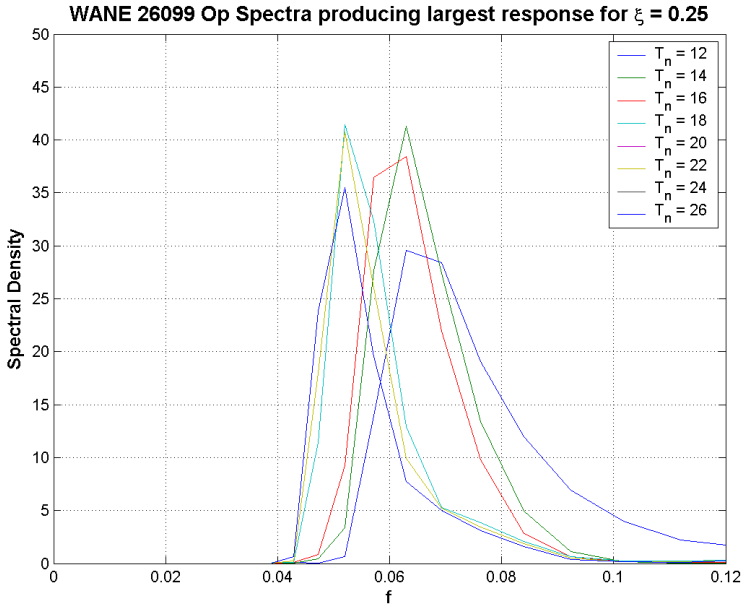

WANE 25947 Op Spectra producing largest response for ξ = 0.05
Spectral Density
f
T_n = 12
T_n = 14
T_n = 16
T_n = 18
T_n = 20
T_n = 22
T_n = 24
T_n = 26

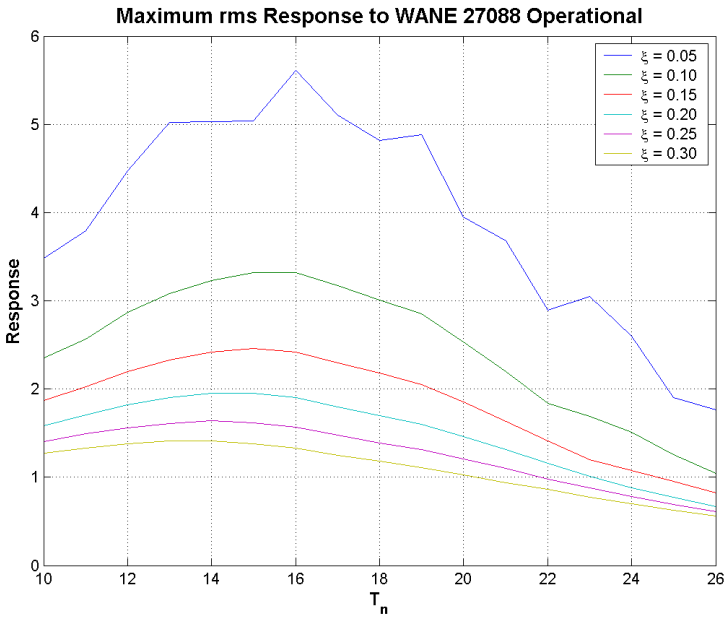

WANE 25947 Op Spectra producing largest response for ξ = 0.25
Spectral Density
f
T_n = 12
T_n = 14
T_n = 16
T_n = 18
T_n = 20
T_n = 22
T_n = 24
T_n = 26

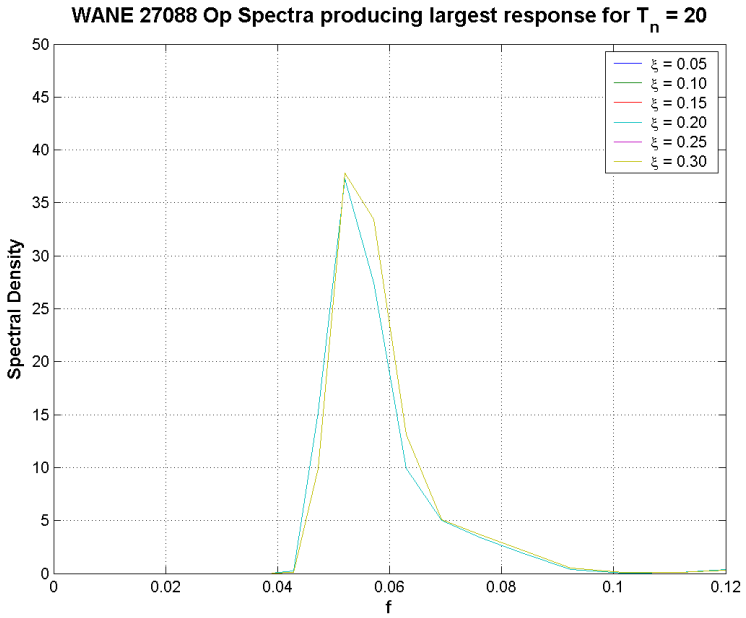

Maximum rms Response to WANE 26099 Operational
Response
T_n
ξ = 0.05
ξ = 0.10
ξ = 0.15
ξ = 0.20
ξ = 0.25
ξ = 0.30

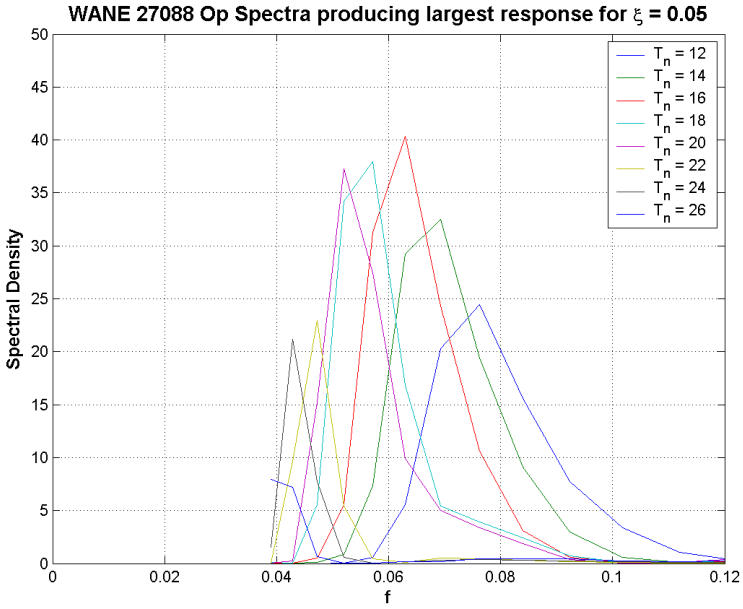

WANE 26099 Op Spectra producing largest response for T_n = 20
Spectral Density
f
ξ = 0.05
ξ = 0.10
ξ = 0.15
ξ = 0.20
ξ = 0.25
ξ = 0.30

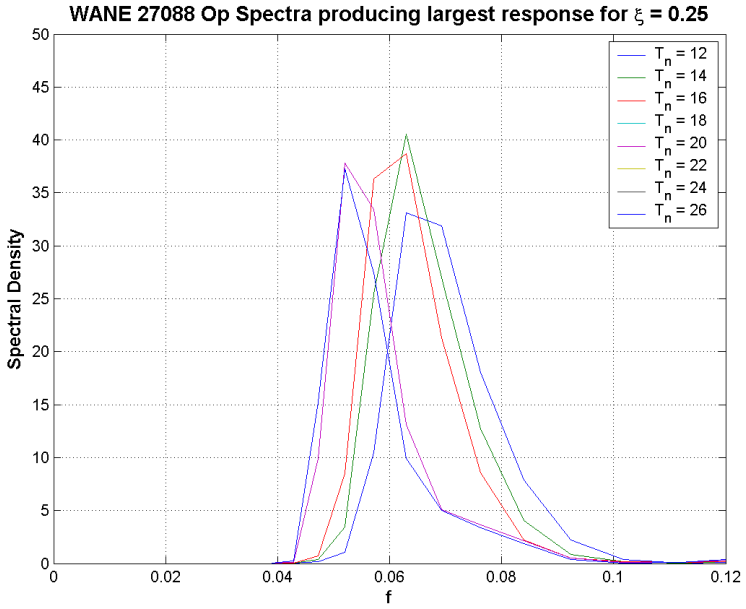

WANE 26099 Op Spectra producing largest response for ξ = 0.05
Spectral Density
f
T_n = 12
T_n = 14
T_n = 16
T_n = 18
T_n = 20
T_n = 22
T_n = 24
T_n = 26

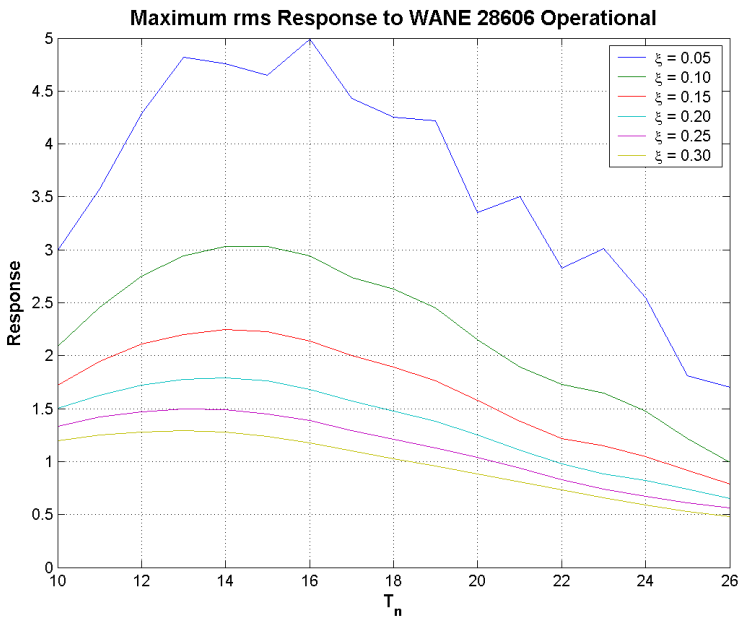

WANE 26099 Op Spectra producing largest response for ξ = 0.25
Spectral Density
f
T_n = 12
T_n = 14
T_n = 16
T_n = 18
T_n = 20
T_n = 22
T_n = 24
T_n = 26

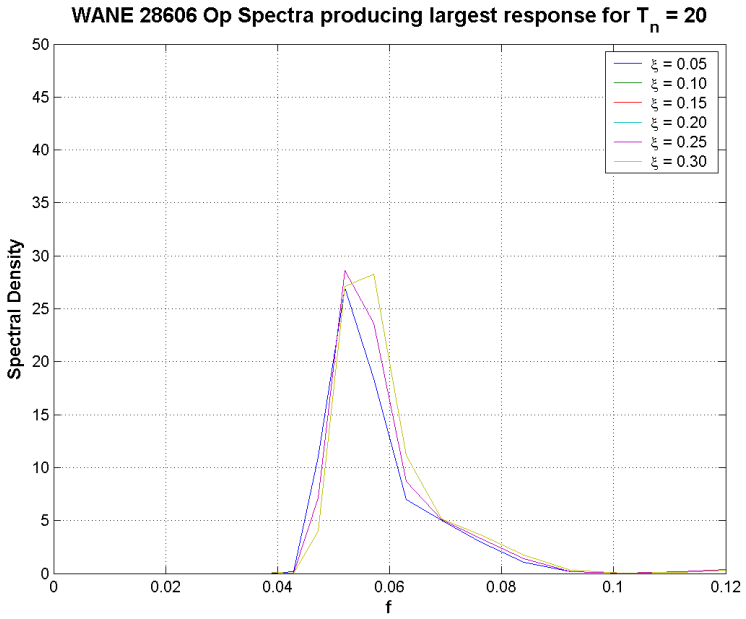

Maximum rms Response to WANE 27088 Operational
Response
T_n
ξ = 0.05
ξ = 0.10
ξ = 0.15
ξ = 0.20
ξ = 0.25
ξ = 0.30

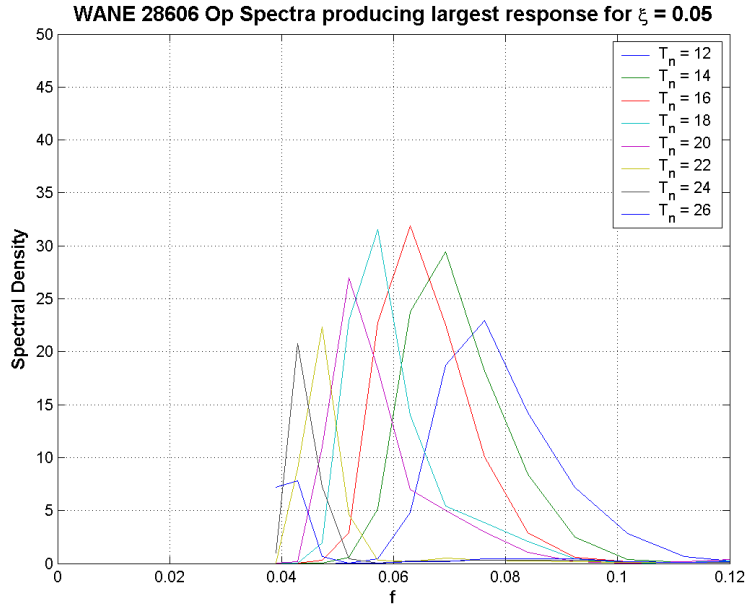

WANE 27088 Op Spectra producing largest response for T_n = 20
Spectral Density
f
ξ = 0.05
ξ = 0.10
ξ = 0.15
ξ = 0.20
ξ = 0.25
ξ = 0.30

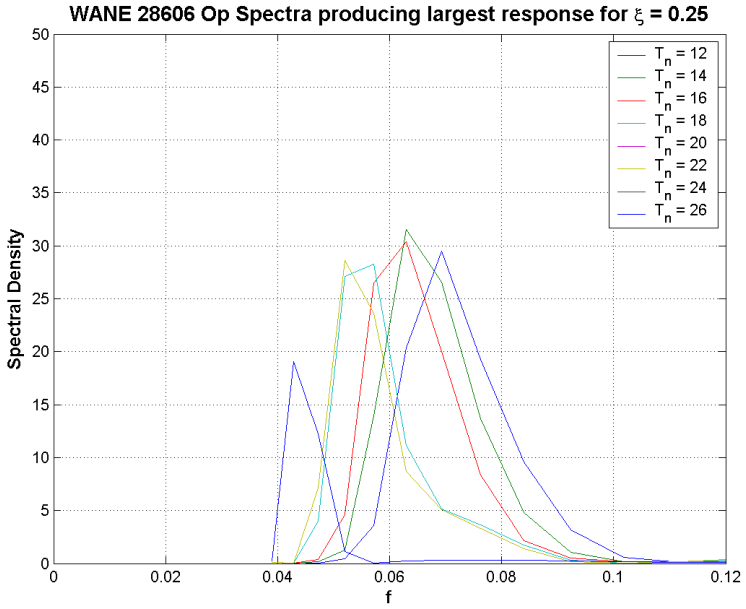

WANE 27088 Op Spectra producing largest response for ξ = 0.05
Spectral Density
f
T_n = 12
T_n = 14
T_n = 16
T_n = 18
T_n = 20
T_n = 22
T_n = 24
T_n = 26

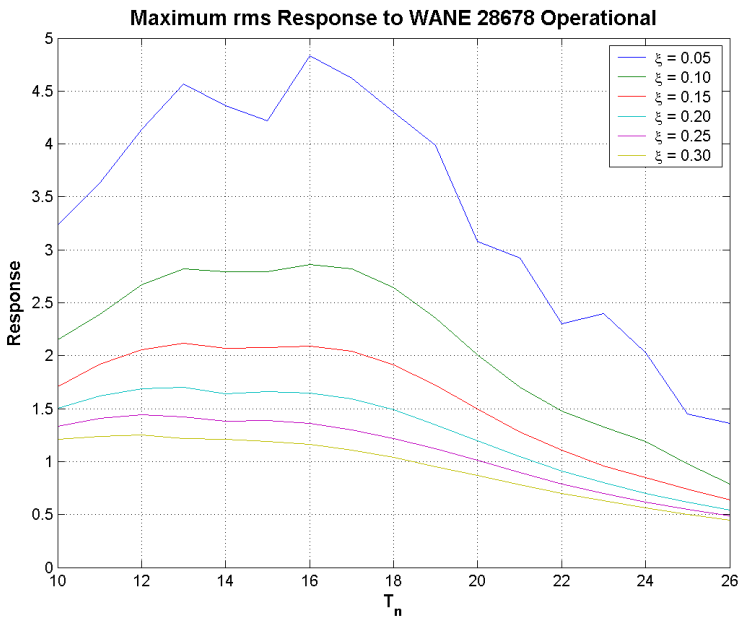

WANE 27088 Op Spectra producing largest response for ξ = 0.25
Spectral Density
f
T_n = 12
T_n = 14
T_n = 16
T_n = 18
T_n = 20
T_n = 22
T_n = 24
T_n = 26

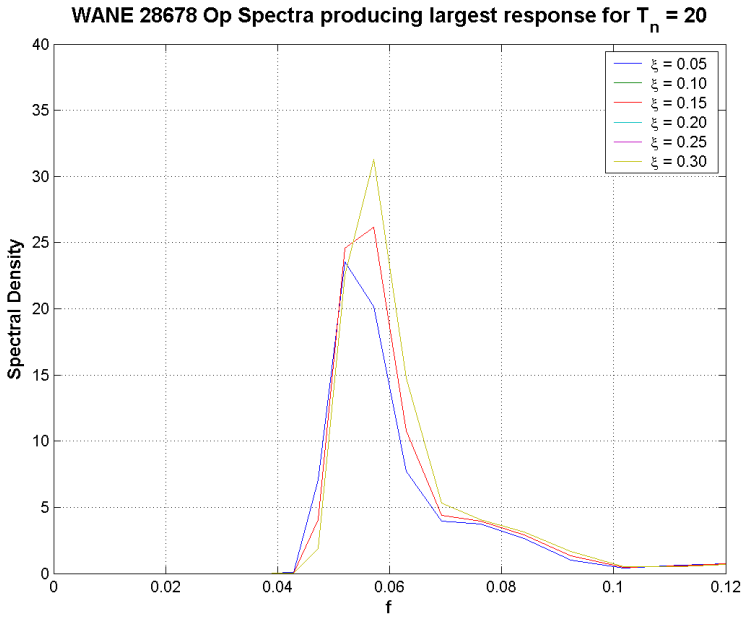

Maximum rms Response to WANE 28606 Operational
Response
T_n
ξ = 0.05
ξ = 0.10
ξ = 0.15
ξ = 0.20
ξ = 0.25
ξ = 0.30

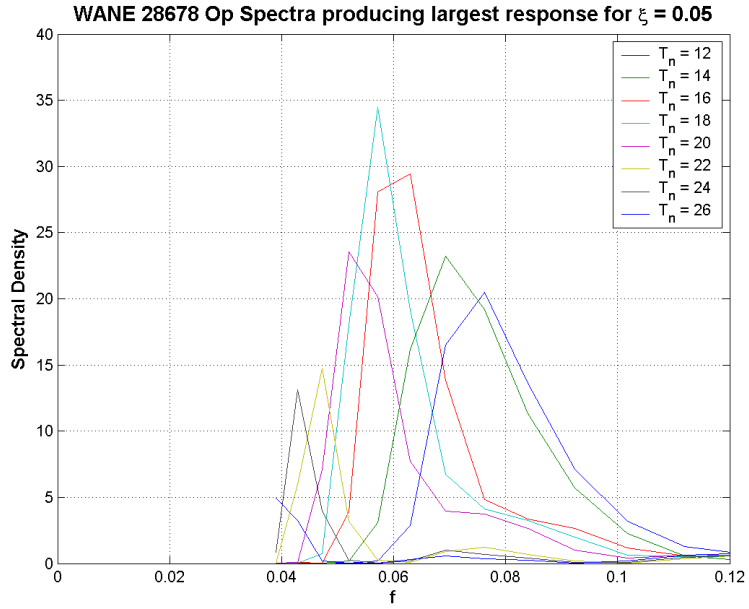

WANE 28606 Op Spectra producing largest response for T_n = 20
Spectral Density
f
ξ = 0.05
ξ = 0.10
ξ = 0.15
ξ = 0.20
ξ = 0.25
ξ = 0.30

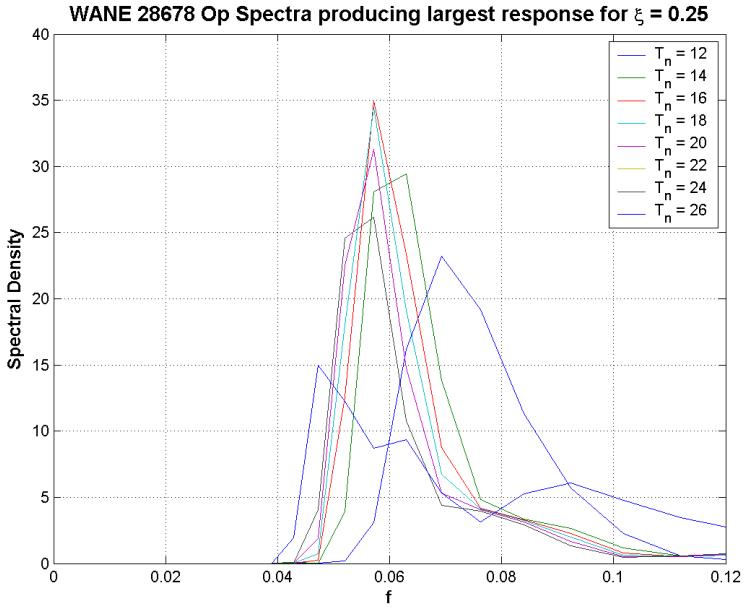

WANE 28606 Op Spectra producing largest response for ξ = 0.05
Spectral Density
f
T_n = 12
T_n = 14
T_n = 16
T_n = 18
T_n = 20
T_n = 22
T_n = 24
T_n = 26

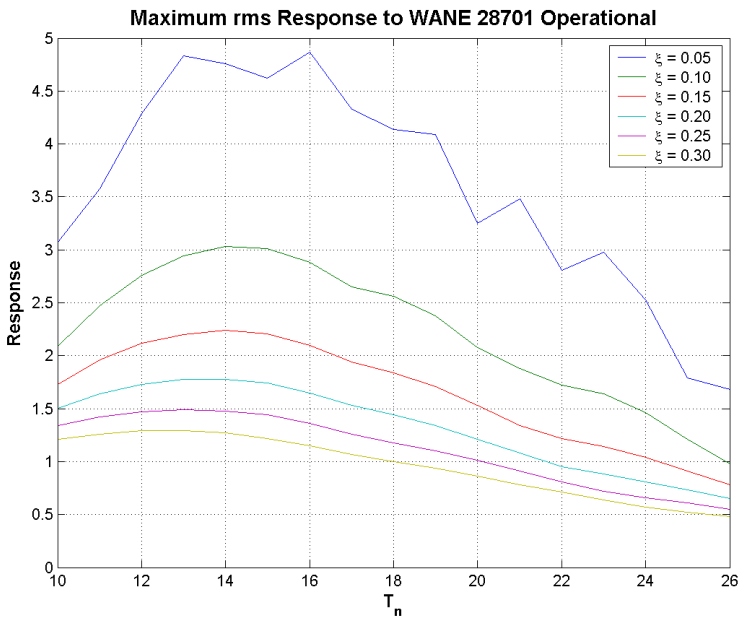

WANE 28606 Op Spectra producing largest response for ξ = 0.25
Spectral Density
f
T_n = 12
T_n = 14
T_n = 16
T_n = 18
T_n = 20
T_n = 22
T_n = 24
T_n = 26

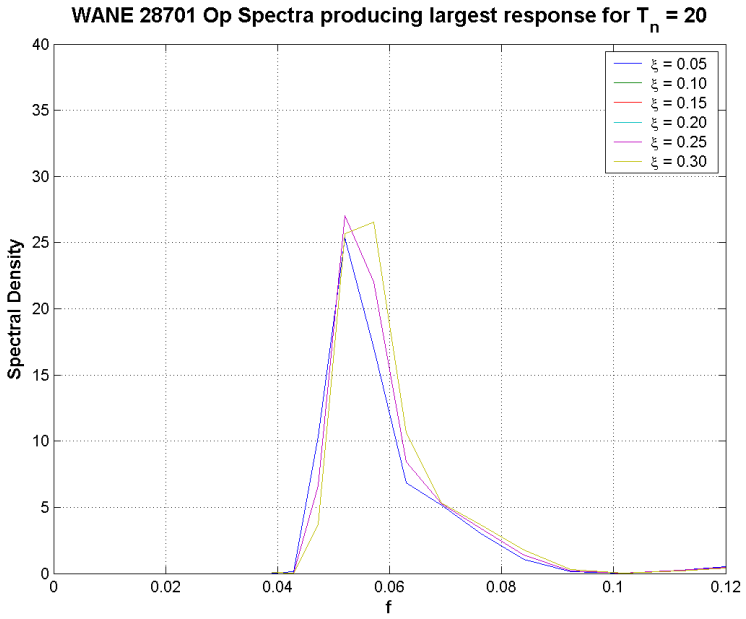

Maximum rms Response to WANE 28678 Operational
Response
T_n
ξ = 0.05
ξ = 0.10
ξ = 0.15
ξ = 0.20
ξ = 0.25
ξ = 0.30

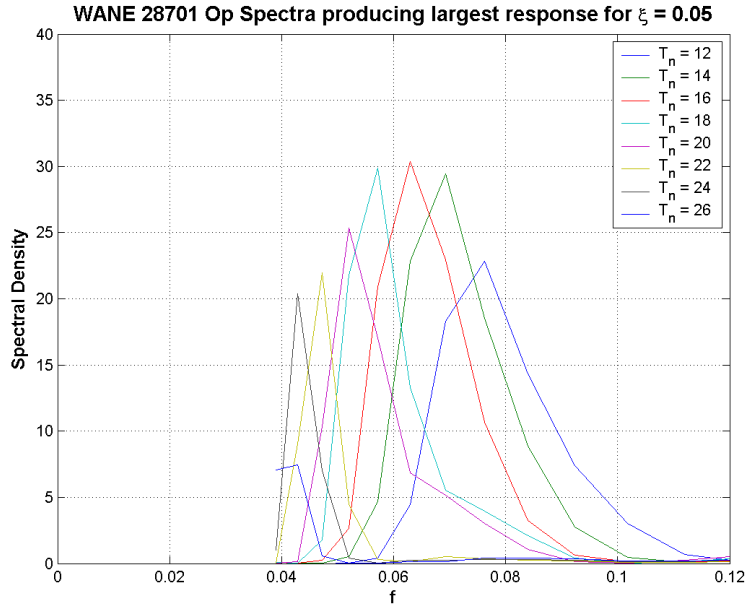

WANE 28678 Op Spectra producing largest response for T_n = 20
Spectral Density
f
ξ = 0.05
ξ = 0.10
ξ = 0.15
ξ = 0.20
ξ = 0.25
ξ = 0.30

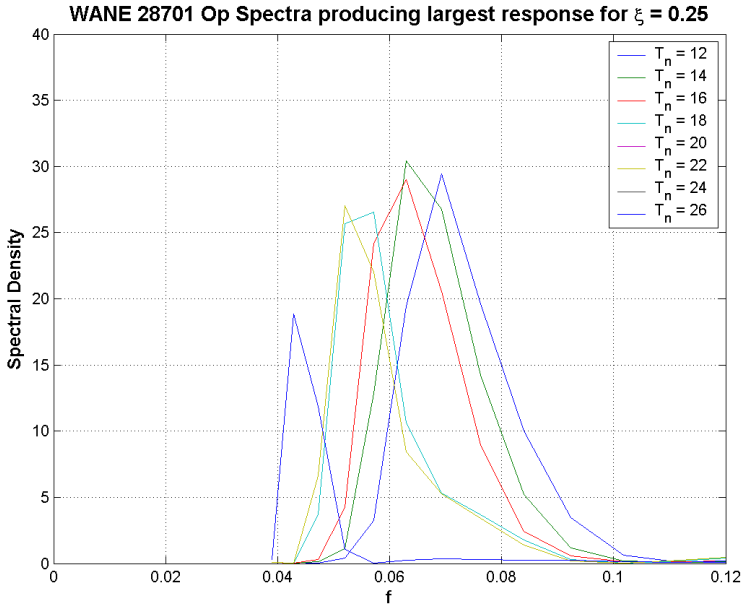

WANE 28678 Op Spectra producing largest response for ξ = 0.05
Spectral Density
f
T_n = 12
T_n = 14
T_n = 16
T_n = 18
T_n = 20
T_n = 22
T_n = 24
T_n = 26

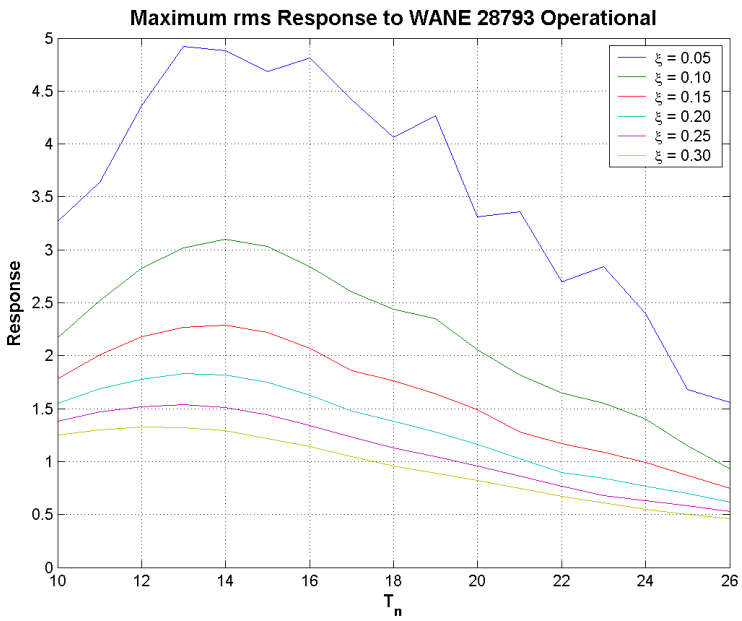

WANE 28678 Op Spectra producing largest response for ξ = 0.25
Spectral Density
f
T_n = 12
T_n = 14
T_n = 16
T_n = 18
T_n = 20
T_n = 22
T_n = 24
T_n = 26

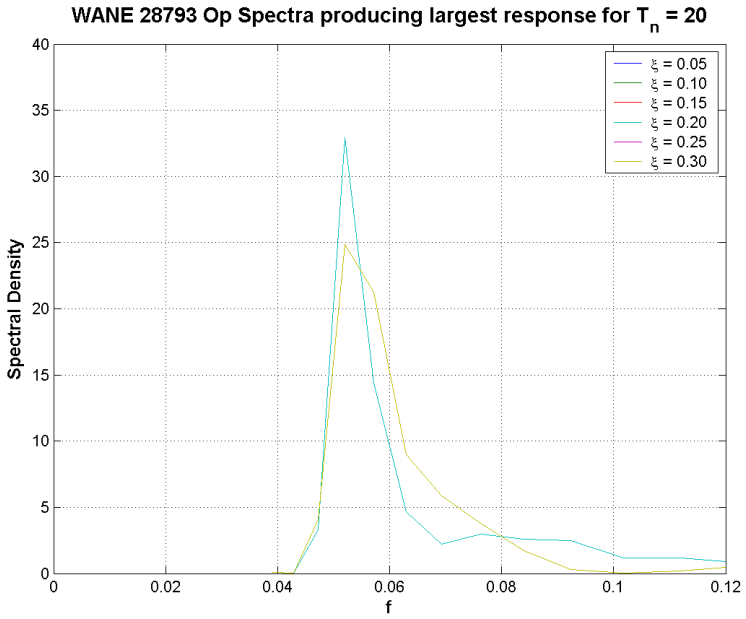

Maximum rms Response to WANE 28701 Operational
Response
T_n
ξ = 0.05
ξ = 0.10
ξ = 0.15
ξ = 0.20
ξ = 0.25
ξ = 0.30

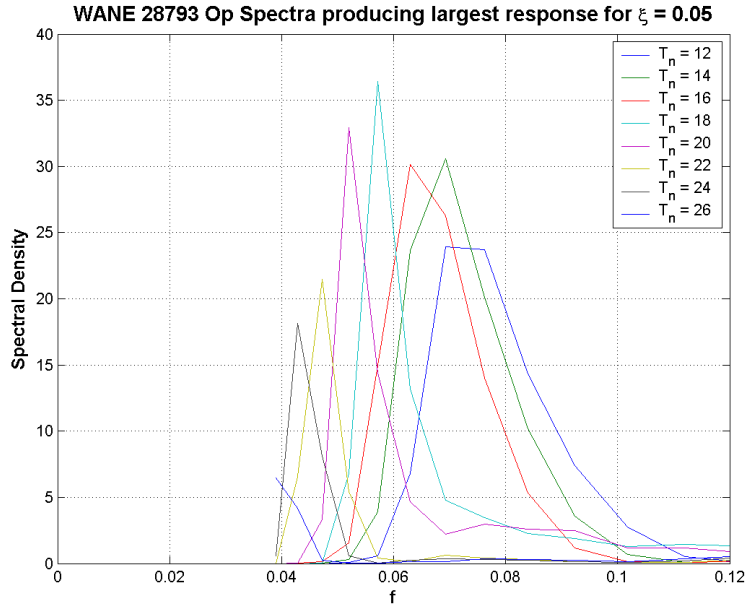

WANE 28701 Op Spectra producing largest response for T_n = 20
Spectral Density
f
ξ = 0.05
ξ = 0.10
ξ = 0.15
ξ = 0.20
ξ = 0.25
ξ = 0.30

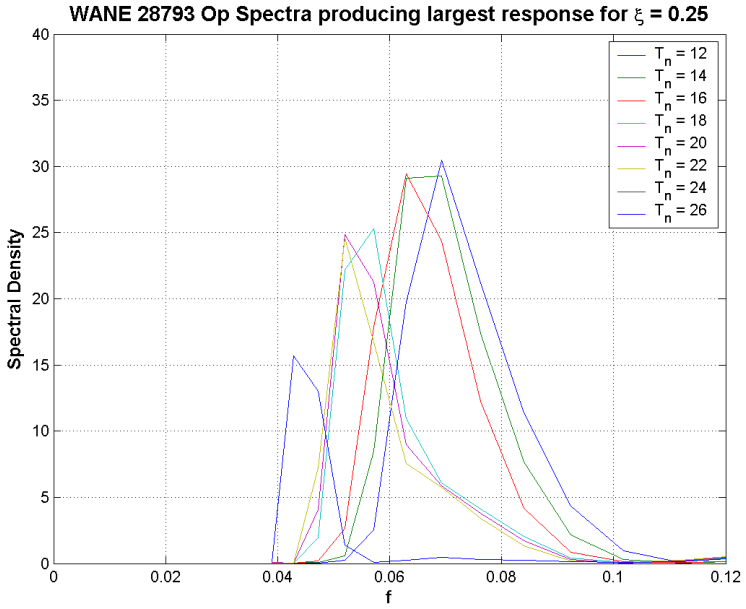

WANE 28701 Op Spectra producing largest response for ξ = 0.05
Spectral Density
f
T_n = 12
T_n = 14
T_n = 16
T_n = 18
T_n = 20
T_n = 22
T_n = 24
T_n = 26


WANE 28701 Op Spectra producing largest response for ξ = 0.25
Spectral Density
f
T_n = 12
T_n = 14
T_n = 16
T_n = 18
T_n = 20
T_n = 22
T_n = 24
T_n = 26


Maximum rms Response to WANE 28793 Operational
Response
T_n
ξ = 0.05
ξ = 0.10
ξ = 0.15
ξ = 0.20
ξ = 0.25
ξ = 0.30


WANE 28793 Op Spectra producing largest response for T_n = 20
Spectral Density
f
ξ = 0.05
ξ = 0.10
ξ = 0.15
ξ = 0.20
ξ = 0.25
ξ = 0.30

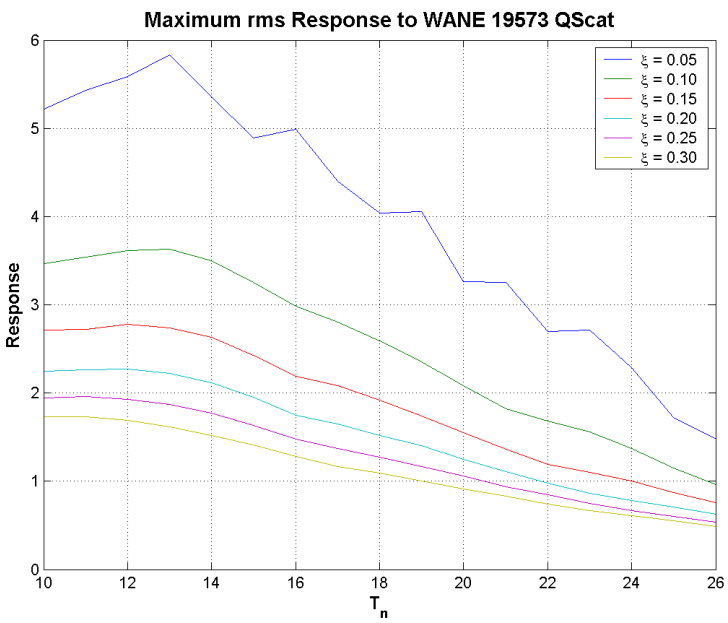

WANE 28793 Op Spectra producing largest response for ξ = 0.05
Spectral Density
f
T_n = 12
T_n = 14
T_n = 16
T_n = 18
T_n = 20
T_n = 22
T_n = 24
T_n = 26

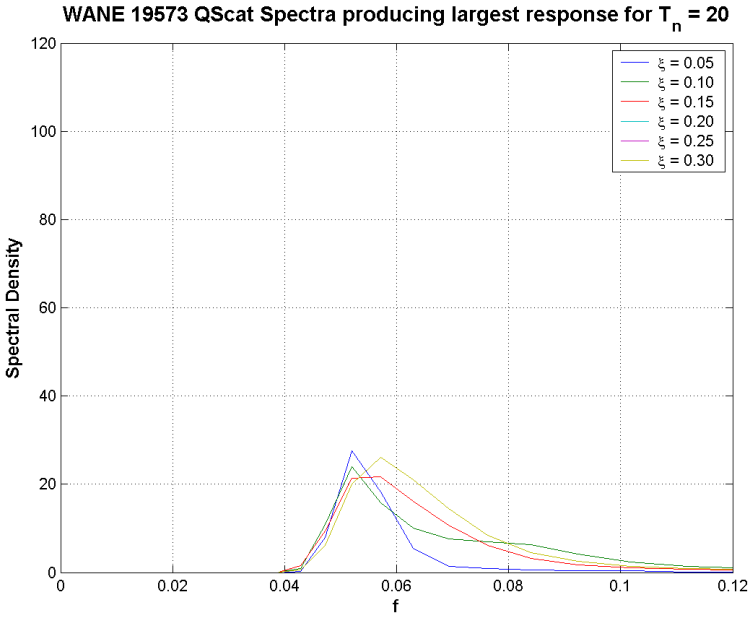

WANE 28793 Op Spectra producing largest response for ξ = 0.25
Spectral Density
f
T_n = 12
T_n = 14
T_n = 16
T_n = 18
T_n = 20
T_n = 22
T_n = 24
T_n = 26

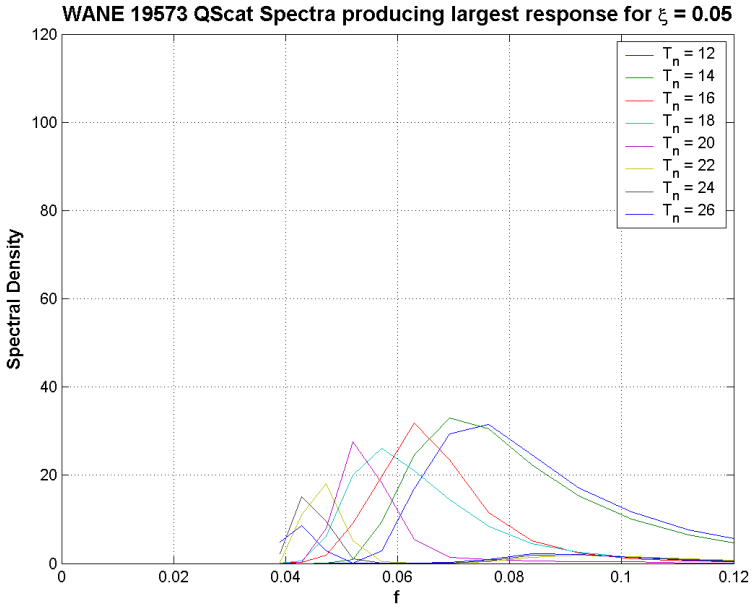
Appendix 7.2

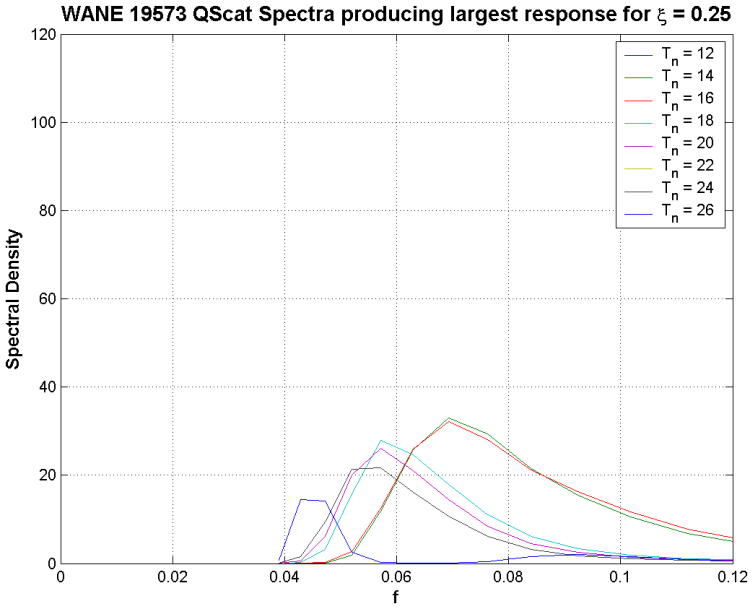
Maximum rms Responses and Associated Spectra

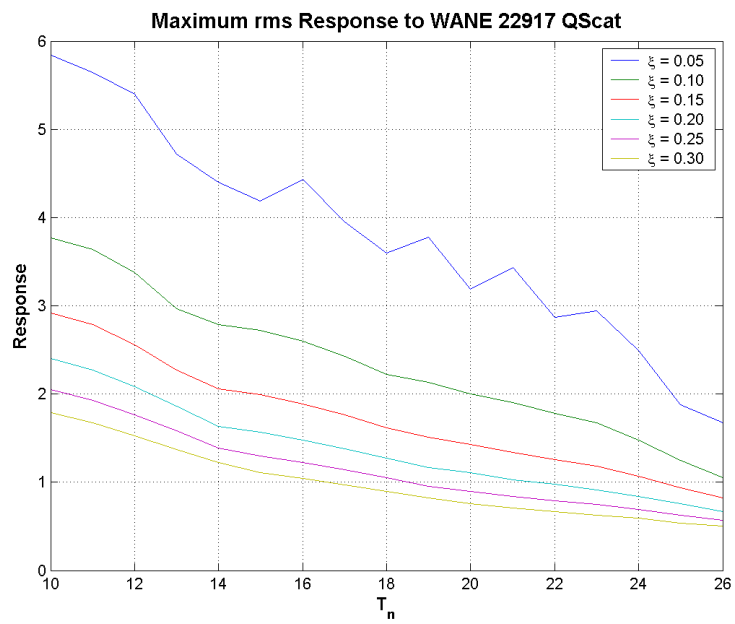
WANE QSCAT Data

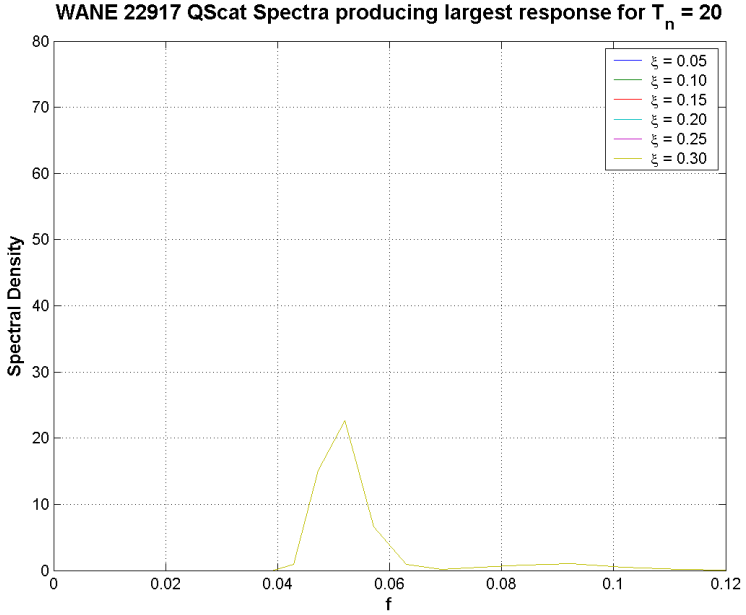

Maximum rms Response to WANE 19573 QScat
Response
T_n
ξ = 0.05
ξ = 0.10
ξ = 0.15
ξ = 0.20
ξ = 0.25
ξ = 0.30

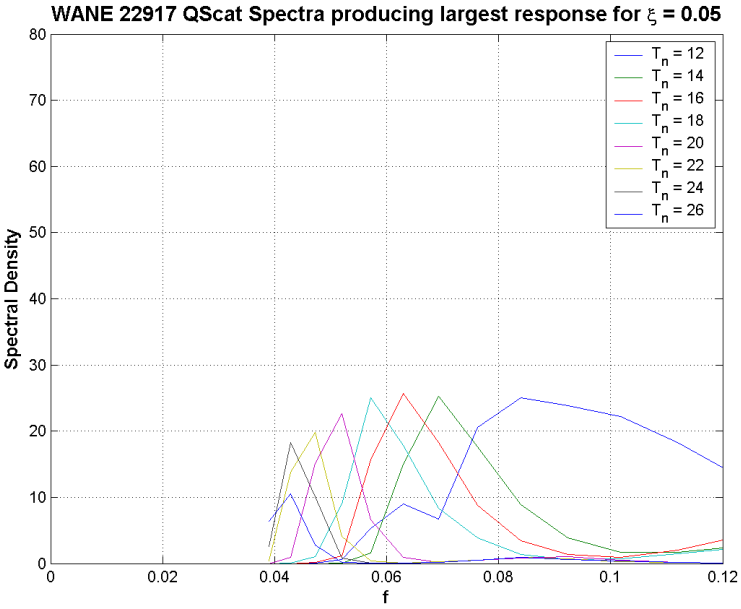

WANE 19573 QScat Spectra producing largest response for T_n = 20
Spectral Density
f
ξ = 0.05
ξ = 0.10
ξ = 0.15
ξ = 0.20
ξ = 0.25
ξ = 0.30

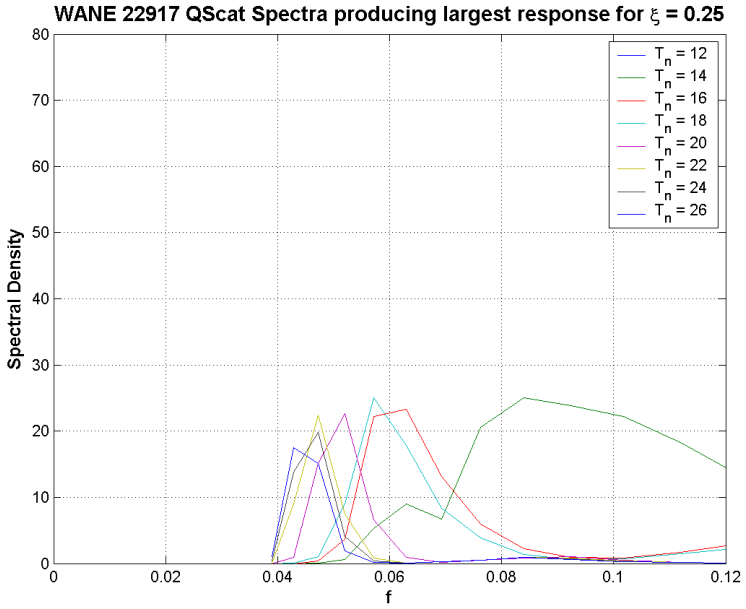

WANE 19573 QScat Spectra producing largest response for ξ = 0.05
Spectral Density
f
T_n = 12
T_n = 14
T_n = 16
T_n = 18
T_n = 20
T_n = 22
T_n = 24
T_n = 26

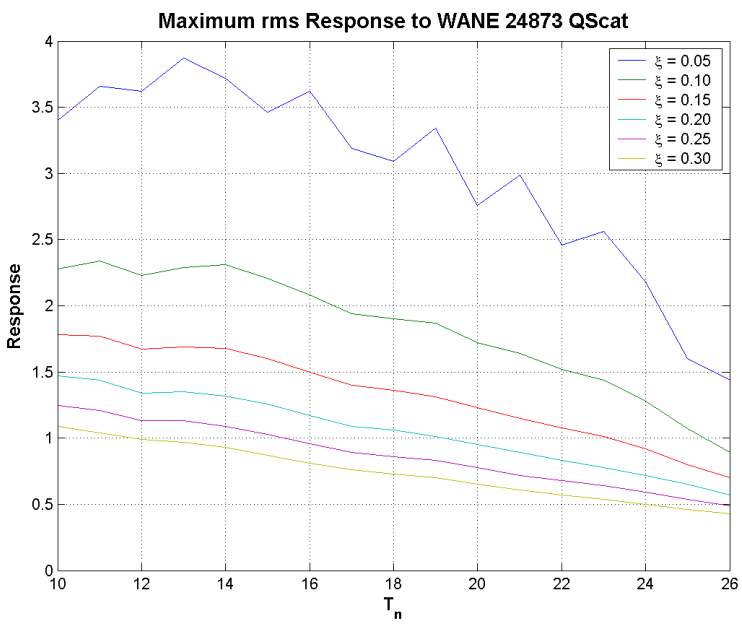

WANE 19573 QScat Spectra producing largest response for ξ = 0.25
Spectral Density
f
T_n = 12
T_n = 14
T_n = 16
T_n = 18
T_n = 20
T_n = 22
T_n = 24
T_n = 26

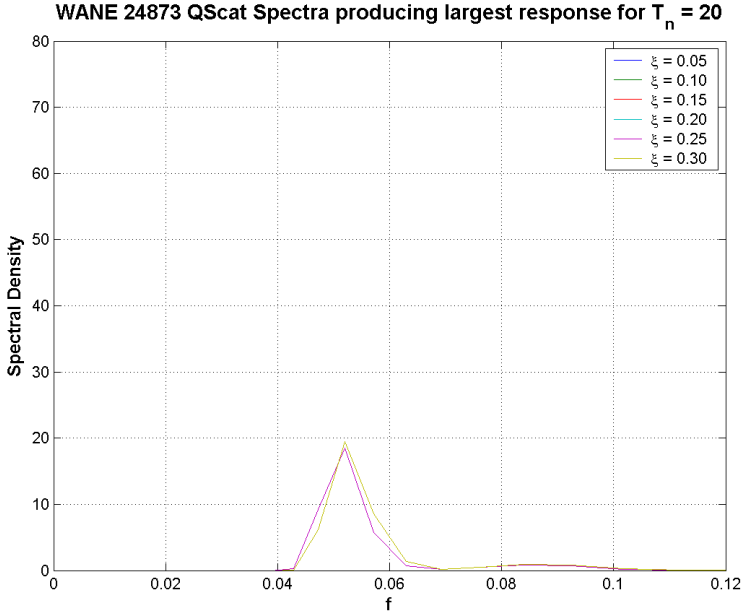

Maximum rms Response to WANE 22917 QScat
Response
T_n
ξ = 0.05
ξ = 0.10
ξ = 0.15
ξ = 0.20
ξ = 0.25
ξ = 0.30

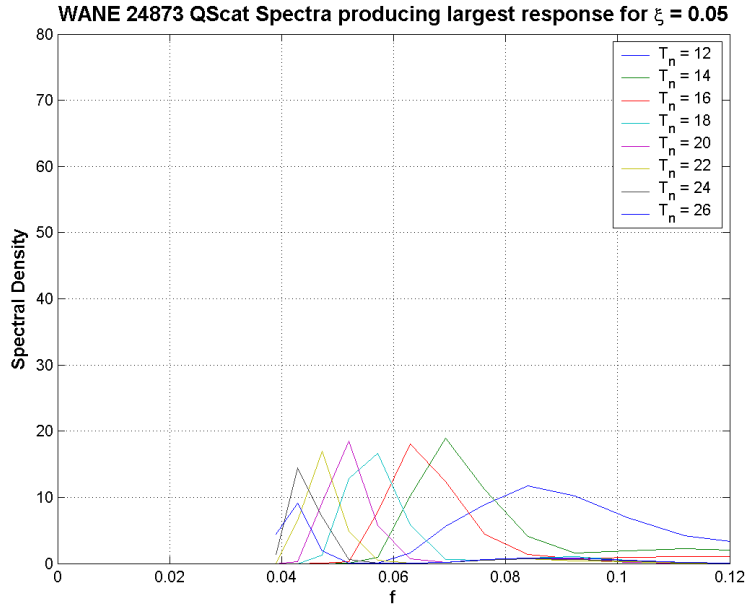

WANE 22917 QScat Spectra producing largest response for T_n = 20
Spectral Density
f
ξ = 0.05
ξ = 0.10
ξ = 0.15
ξ = 0.20
ξ = 0.25
ξ = 0.30

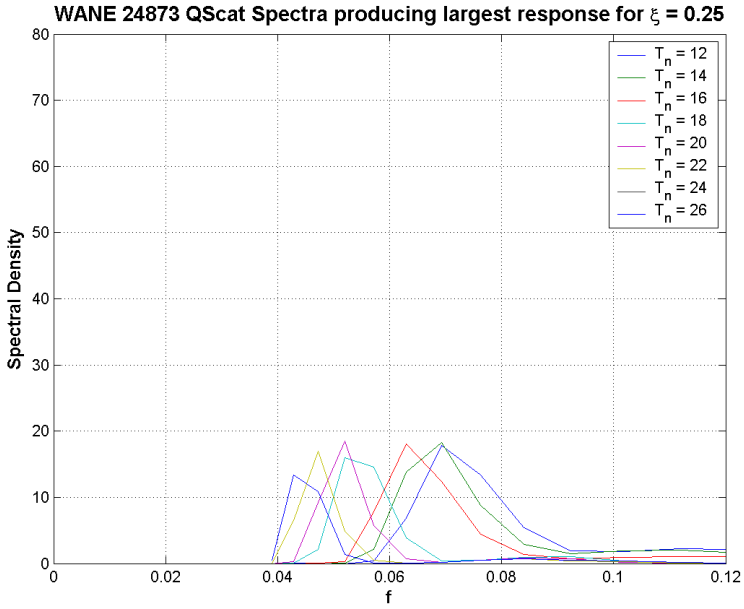

WANE 22917 QScat Spectra producing largest response for ξ = 0.05
Spectral Density
f
T_n = 12
T_n = 14
T_n = 16
T_n = 18
T_n = 20
T_n = 22
T_n = 24
T_n = 26

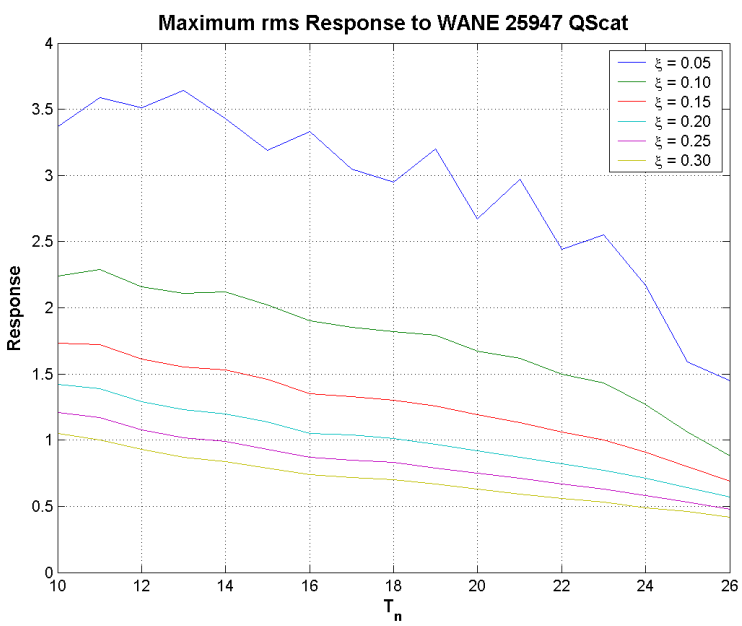

WANE 22917 QScat Spectra producing largest response for ξ = 0.25
Spectral Density
f
T_n = 12
T_n = 14
T_n = 16
T_n = 18
T_n = 20
T_n = 22
T_n = 24
T_n = 26

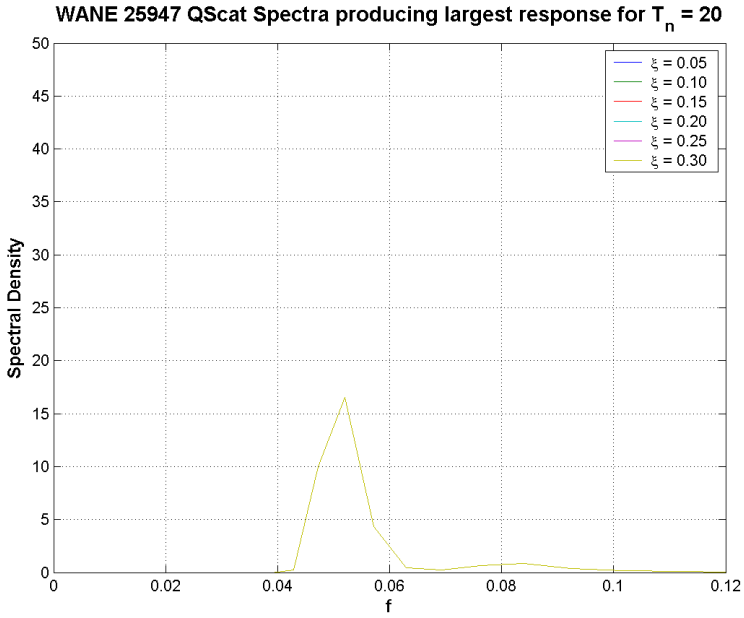

Maximum rms Response to WANE 24873 QScat
Response
T_n
ξ = 0.05
ξ = 0.10
ξ = 0.15
ξ = 0.20
ξ = 0.25
ξ = 0.30

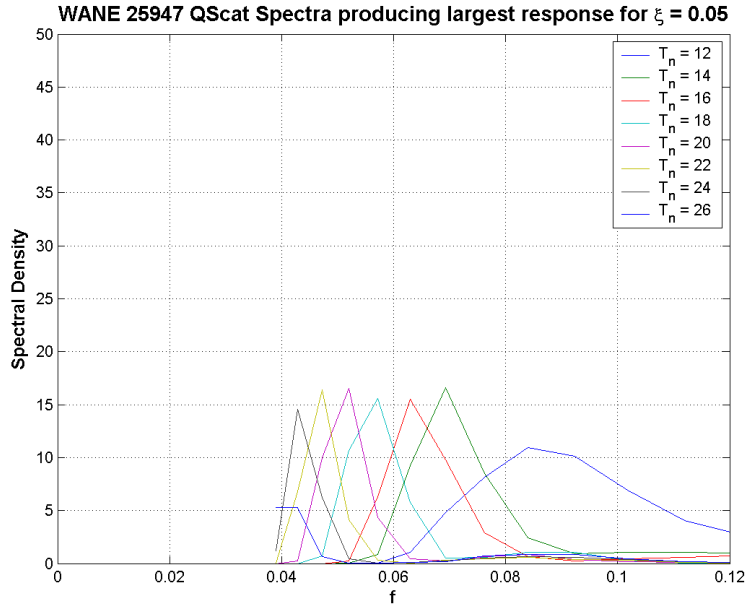

WANE 24873 QScat Spectra producing largest response for T_n = 20
Spectral Density
f
ξ = 0.05
ξ = 0.10
ξ = 0.15
ξ = 0.20
ξ = 0.25
ξ = 0.30

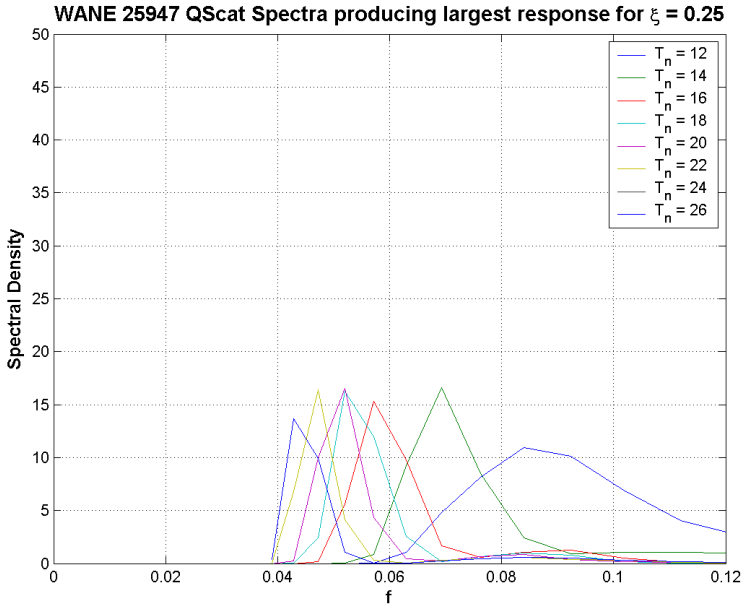

WANE 24873 QScat Spectra producing largest response for ξ = 0.05
Spectral Density
f
T_n = 12
T_n = 14
T_n = 16
T_n = 18
T_n = 20
T_n = 22
T_n = 24
T_n = 26

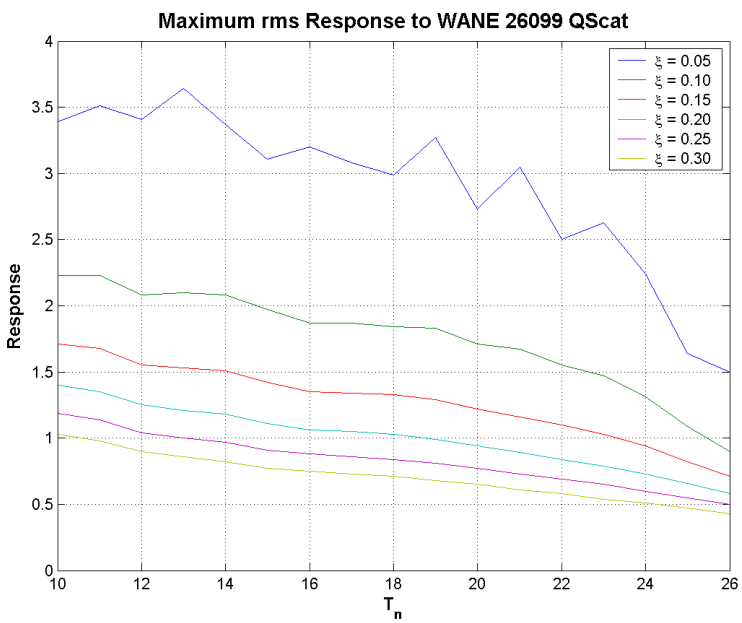

WANE 24873 QScat Spectra producing largest response for ξ = 0.25
Spectral Density
f
T_n = 12
T_n = 14
T_n = 16
T_n = 18
T_n = 20
T_n = 22
T_n = 24
T_n = 26

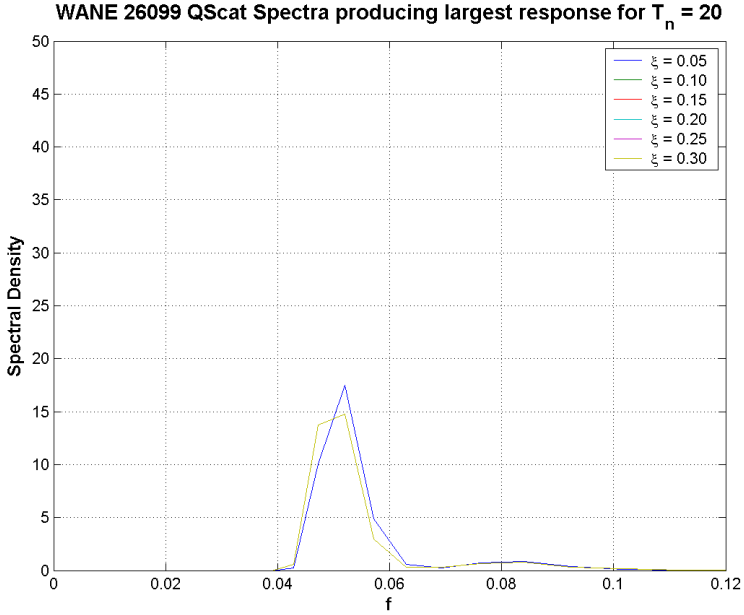

Maximum rms Response to WANE 25947 QScat
Response
T_n
ξ = 0.05
ξ = 0.10
ξ = 0.15
ξ = 0.20
ξ = 0.25
ξ = 0.30

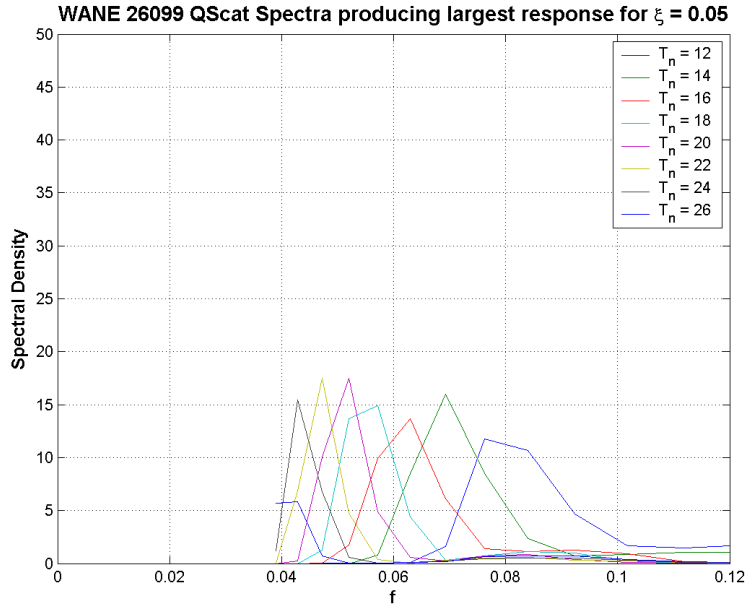

WANE 25947 QScat Spectra producing largest response for T_n = 20
Spectral Density
f
ξ = 0.05
ξ = 0.10
ξ = 0.15
ξ = 0.20
ξ = 0.25
ξ = 0.30

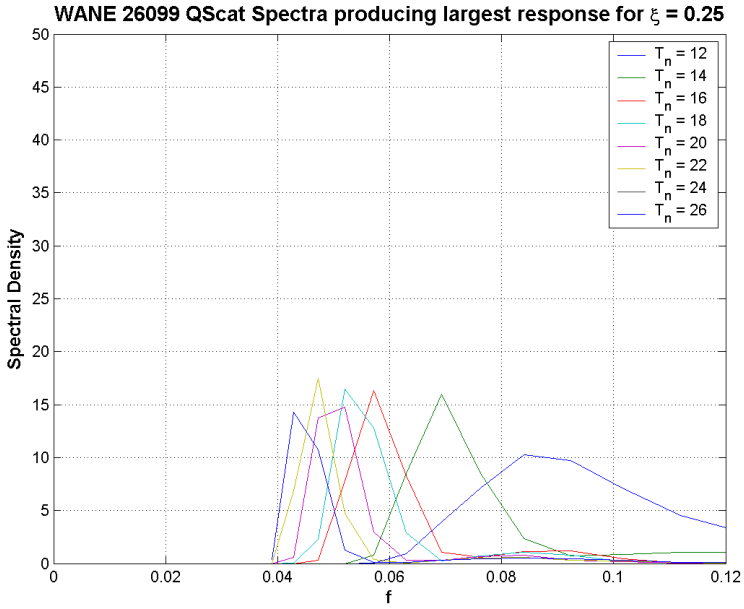

WANE 25947 QScat Spectra producing largest response for ξ = 0.05
Spectral Density
f
T_n = 12
T_n = 14
T_n = 16
T_n = 18
T_n = 20
T_n = 22
T_n = 24
T_n = 26

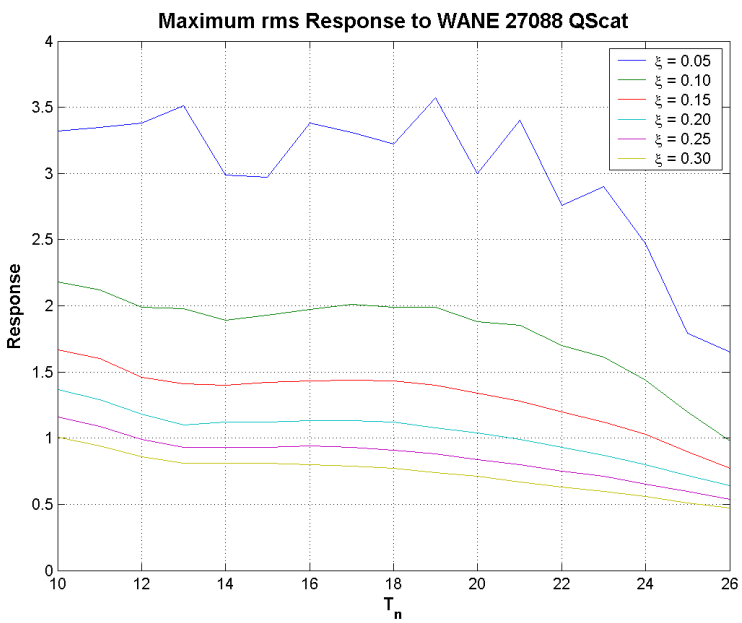

WANE 25947 QScat Spectra producing largest response for ξ = 0.25
Spectral Density
f
T_n = 12
T_n = 14
T_n = 16
T_n = 18
T_n = 20
T_n = 22
T_n = 24
T_n = 26

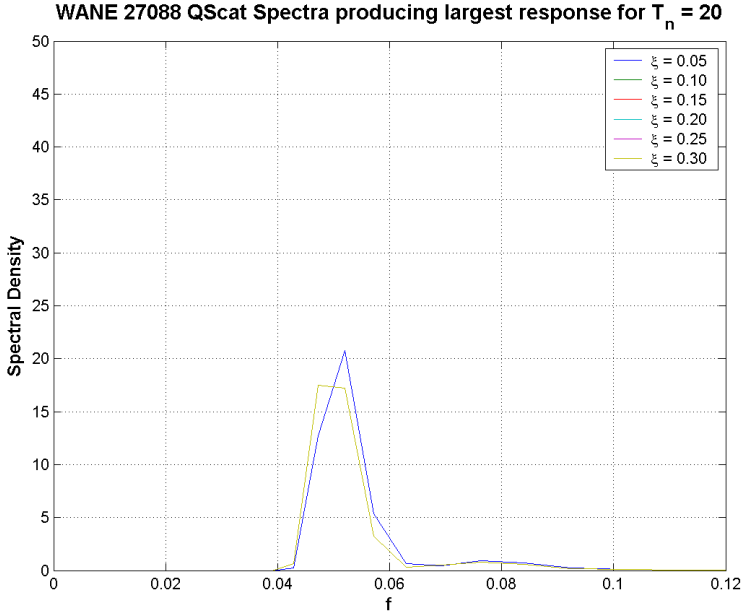

Maximum rms Response to WANE 26099 QScat
Response
T_n
ξ = 0.05
ξ = 0.10
ξ = 0.15
ξ = 0.20
ξ = 0.25
ξ = 0.30

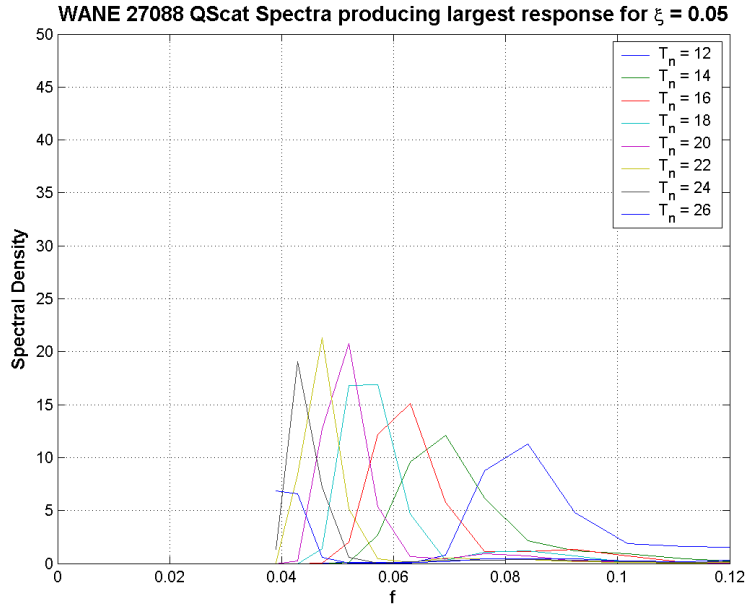

WANE 26099 QScat Spectra producing largest response for T_n = 20
Spectral Density
f
ξ = 0.05
ξ = 0.10
ξ = 0.15
ξ = 0.20
ξ = 0.25
ξ = 0.30

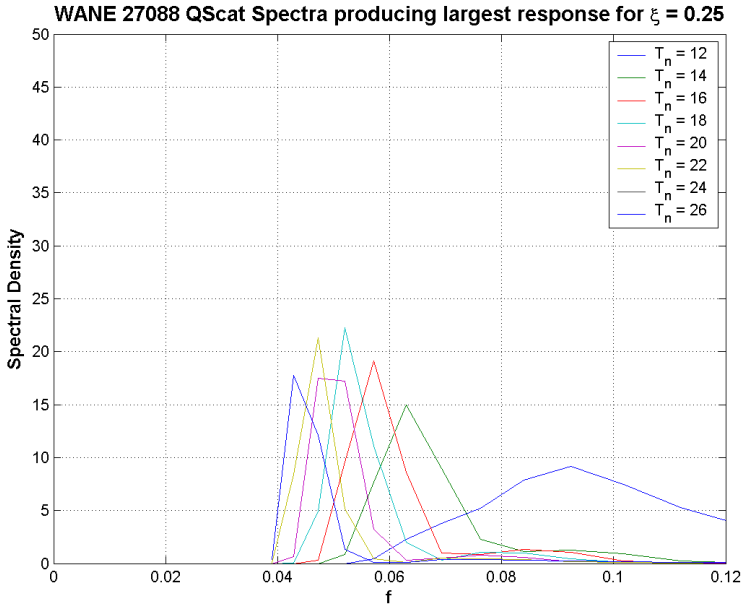

WANE 26099 QScat Spectra producing largest response for ξ = 0.05
Spectral Density
f
T_n = 12
T_n = 14
T_n = 16
T_n = 18
T_n = 20
T_n = 22
T_n = 24
T_n = 26

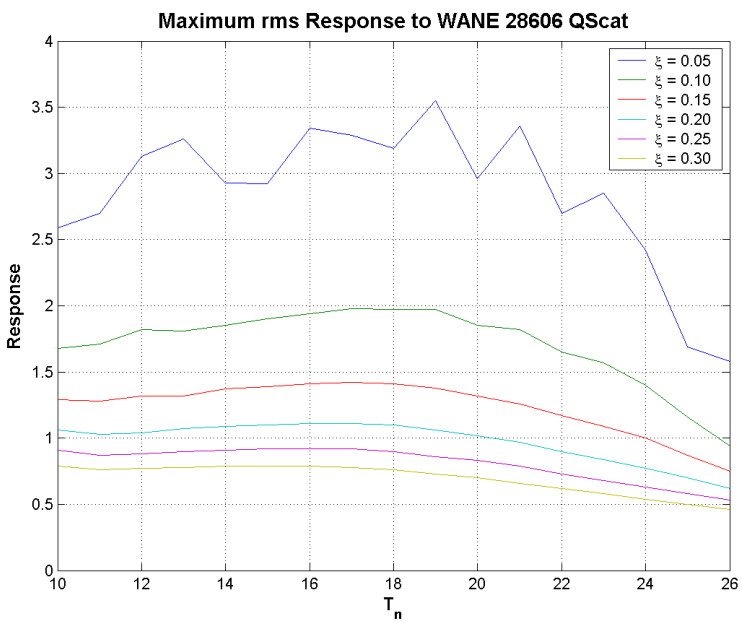

WANE 26099 QScat Spectra producing largest response for ξ = 0.25
Spectral Density
f
T_n = 12
T_n = 14
T_n = 16
T_n = 18
T_n = 20
T_n = 22
T_n = 24
T_n = 26

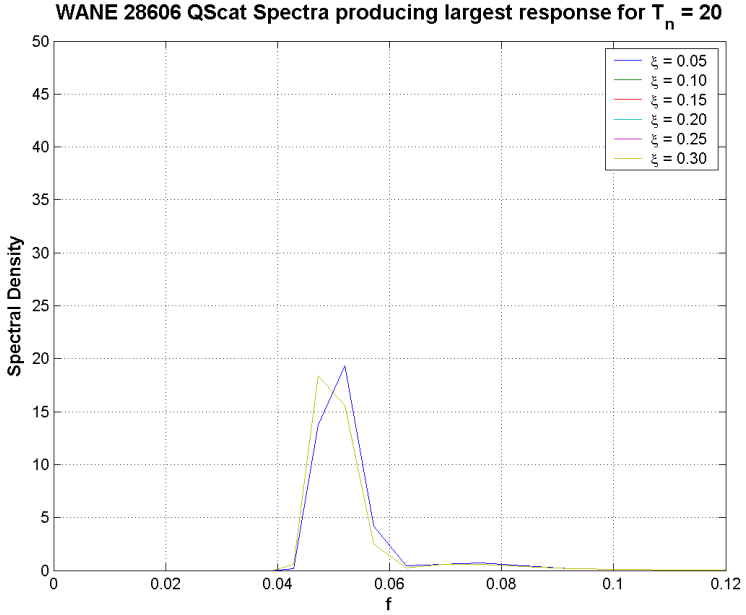

Maximum rms Response to WANE 27088 QScat
Response
T_n
ξ = 0.05
ξ = 0.10
ξ = 0.15
ξ = 0.20
ξ = 0.25
ξ = 0.30

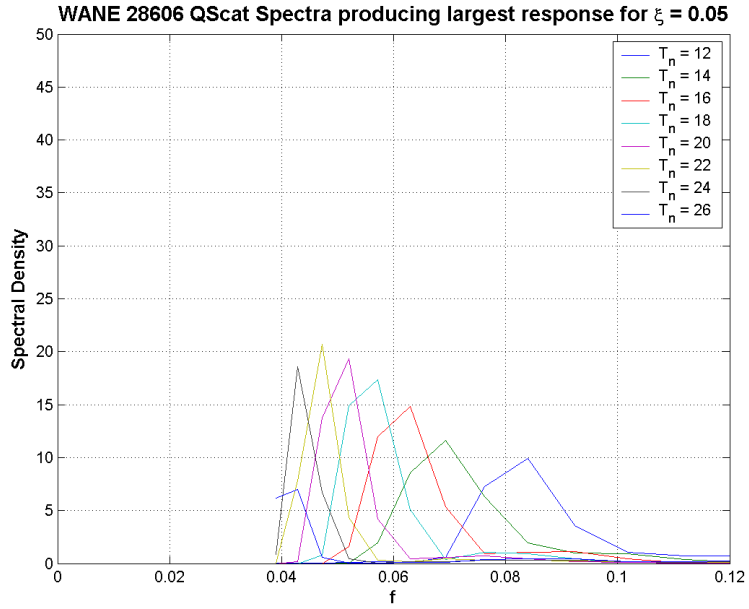

WANE 27088 QScat Spectra producing largest response for T_n = 20
Spectral Density
f
ξ = 0.05
ξ = 0.10
ξ = 0.15
ξ = 0.20
ξ = 0.25
ξ = 0.30

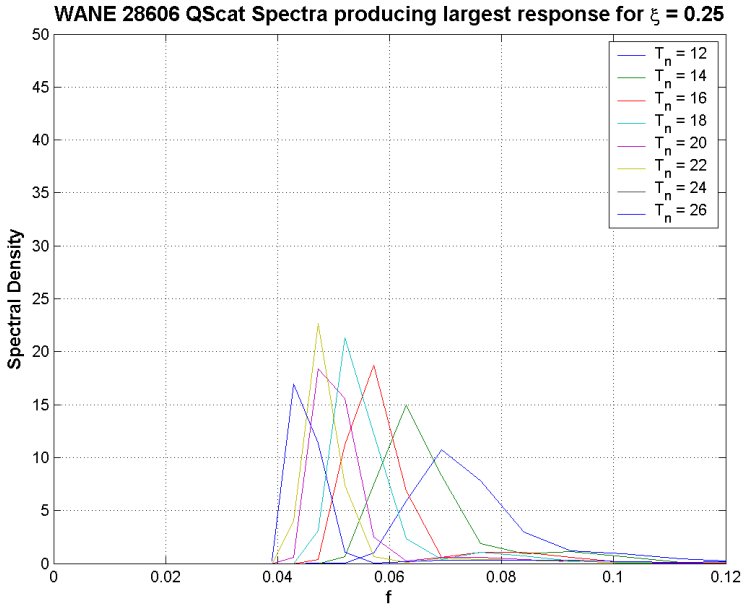

WANE 27088 QScat Spectra producing largest response for ξ = 0.05
Spectral Density
f
T_n = 12
T_n = 14
T_n = 16
T_n = 18
T_n = 20
T_n = 22
T_n = 24
T_n = 26

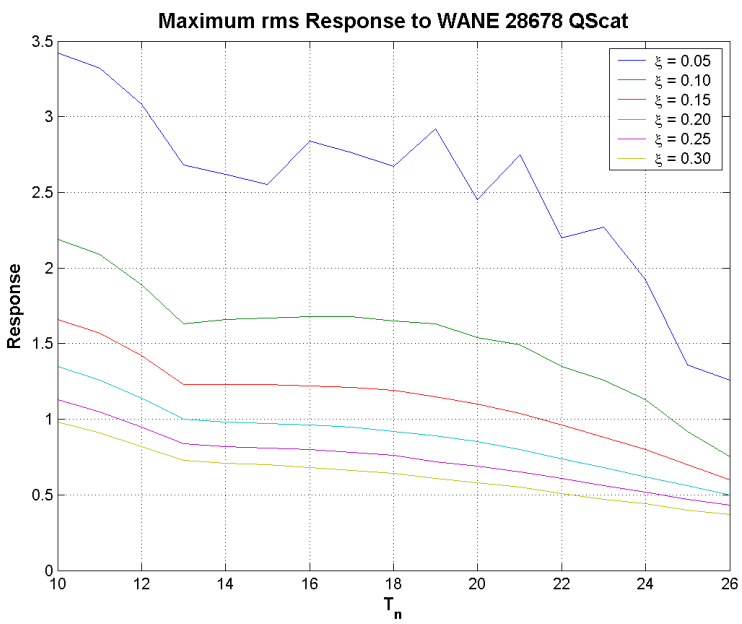

WANE 27088 QScat Spectra producing largest response for ξ = 0.25
Spectral Density
f
T_n = 12
T_n = 14
T_n = 16
T_n = 18
T_n = 20
T_n = 22
T_n = 24
T_n = 26

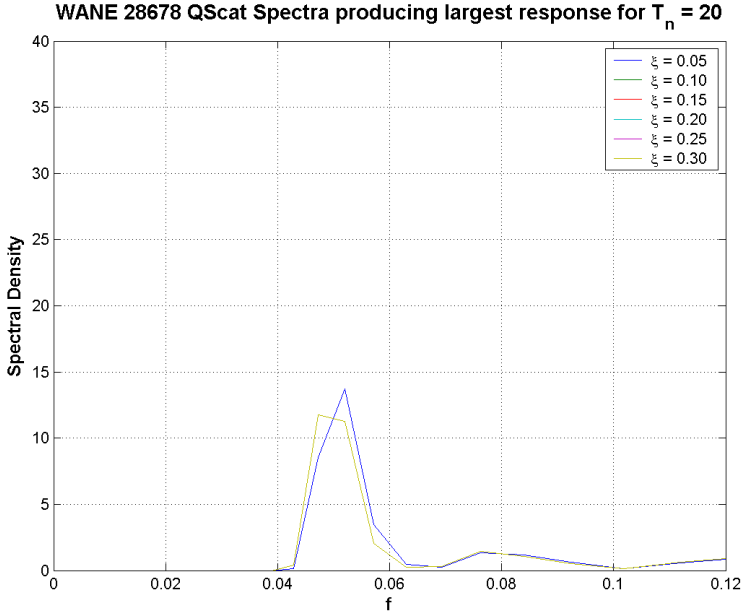

Maximum rms Response to WANE 28606 QScat
Response
T_n
ξ = 0.05
ξ = 0.10
ξ = 0.15
ξ = 0.20
ξ = 0.25
ξ = 0.30

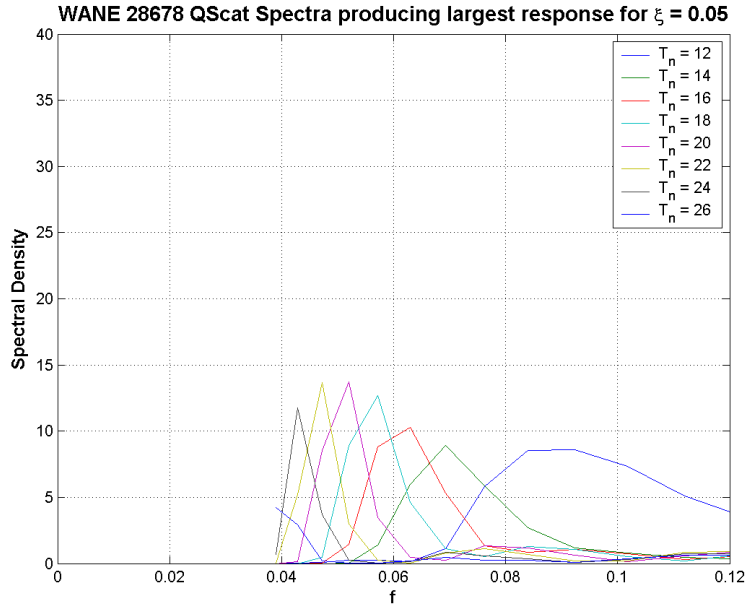

WANE 28606 QScat Spectra producing largest response for T_n = 20
Spectral Density
f
ξ = 0.05
ξ = 0.10
ξ = 0.15
ξ = 0.20
ξ = 0.25
ξ = 0.30

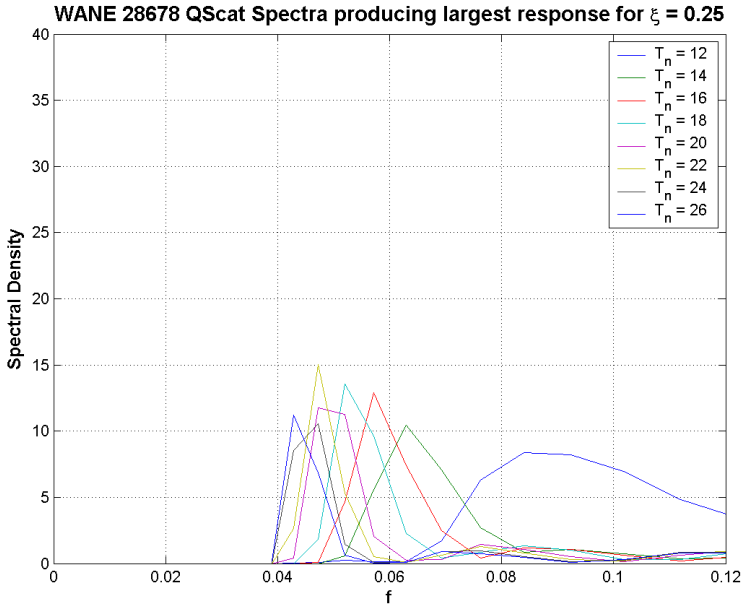

WANE 28606 QScat Spectra producing largest response for ξ = 0.05
Spectral Density
f
T_n = 12
T_n = 14
T_n = 16
T_n = 18
T_n = 20
T_n = 22
T_n = 24
T_n = 26

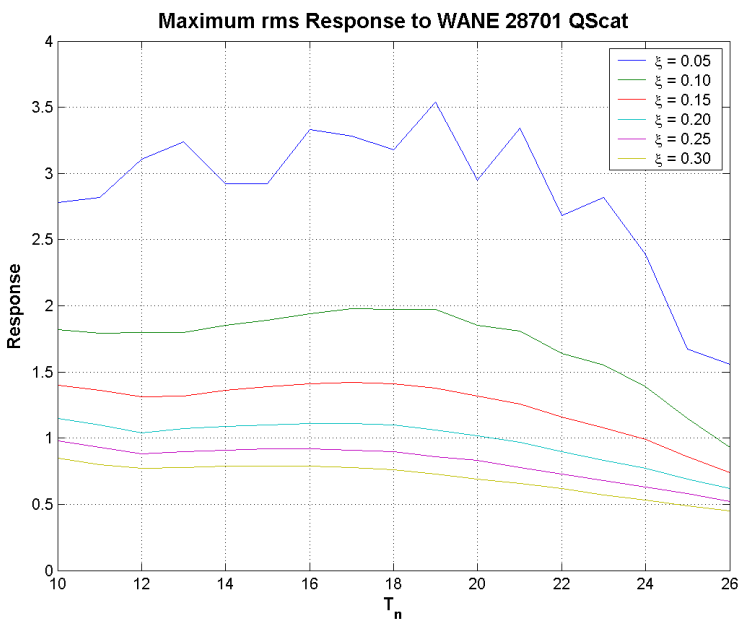

WANE 28606 QScat Spectra producing largest response for ξ = 0.25
Spectral Density
f
T_n = 12
T_n = 14
T_n = 16
T_n = 18
T_n = 20
T_n = 22
T_n = 24
T_n = 26

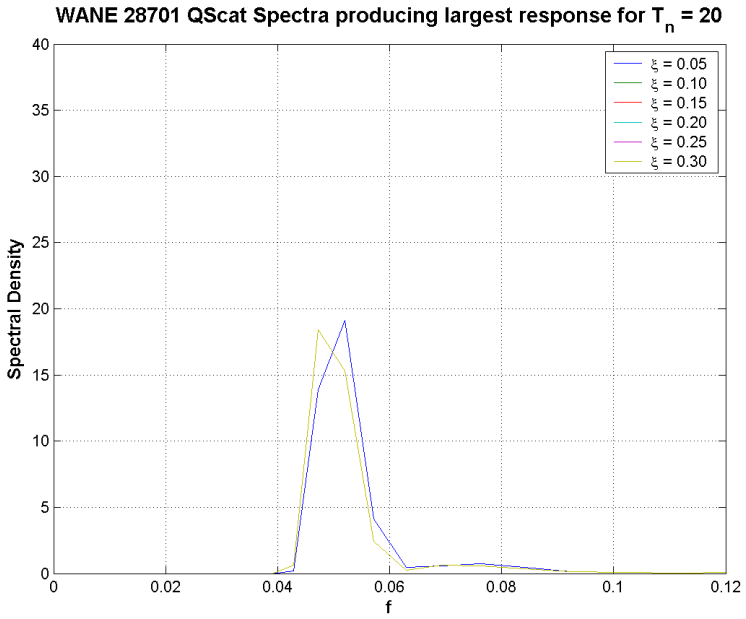

Maximum rms Response to WANE 28678 QScat
Response
T_n
ξ = 0.05
ξ = 0.10
ξ = 0.15
ξ = 0.20
ξ = 0.25
ξ = 0.30

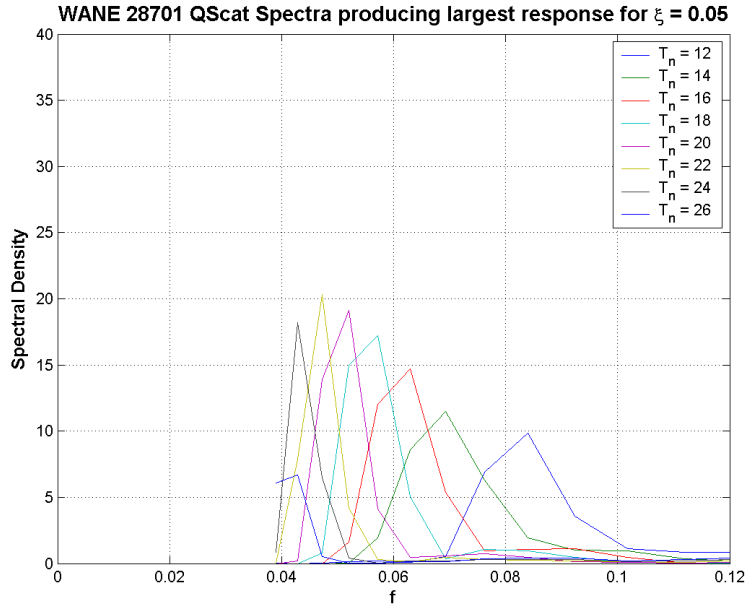

WANE 28678 QScat Spectra producing largest response for T_n = 20
Spectral Density
f
ξ = 0.05
ξ = 0.10
ξ = 0.15
ξ = 0.20
ξ = 0.25
ξ = 0.30

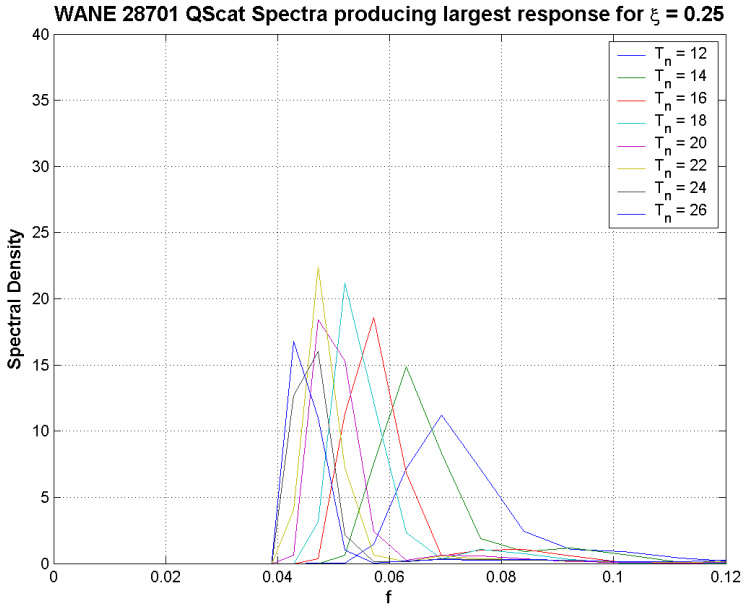

WANE 28678 QScat Spectra producing largest response for ξ = 0.05
Spectral Density
f
T_n = 12
T_n = 14
T_n = 16
T_n = 18
T_n = 20
T_n = 22
T_n = 24
T_n = 26

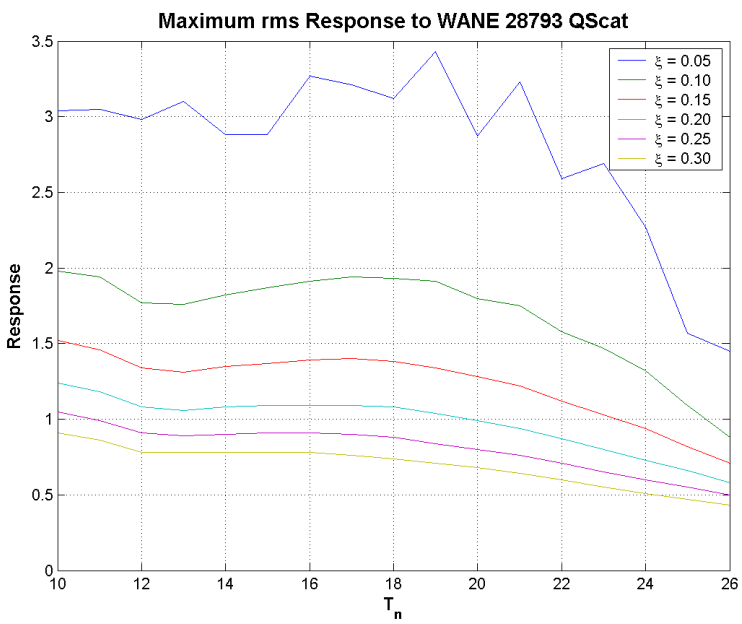

WANE 28678 QScat Spectra producing largest response for ξ = 0.25
Spectral Density
f
T_n = 12
T_n = 14
T_n = 16
T_n = 18
T_n = 20
T_n = 22
T_n = 24
T_n = 26

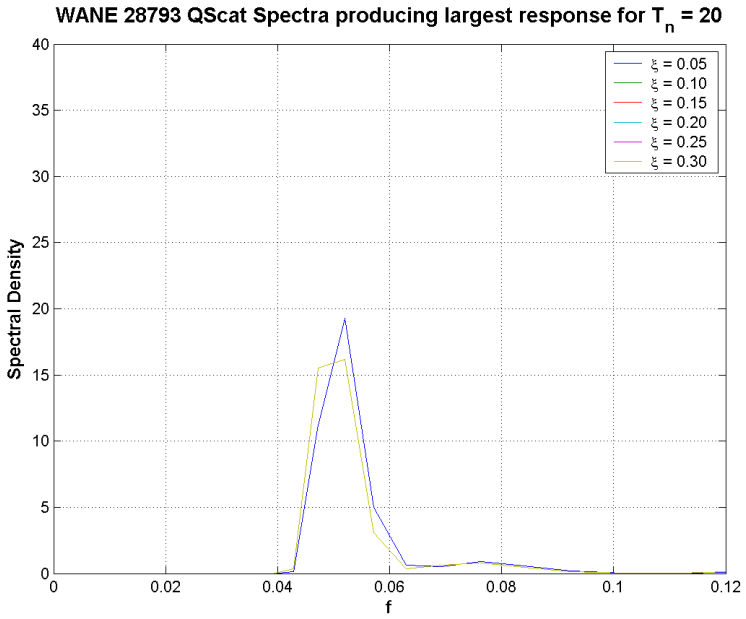

Maximum rms Response to WANE 28701 QScat
Response
T_n
ξ = 0.05
ξ = 0.10
ξ = 0.15
ξ = 0.20
ξ = 0.25
ξ = 0.30

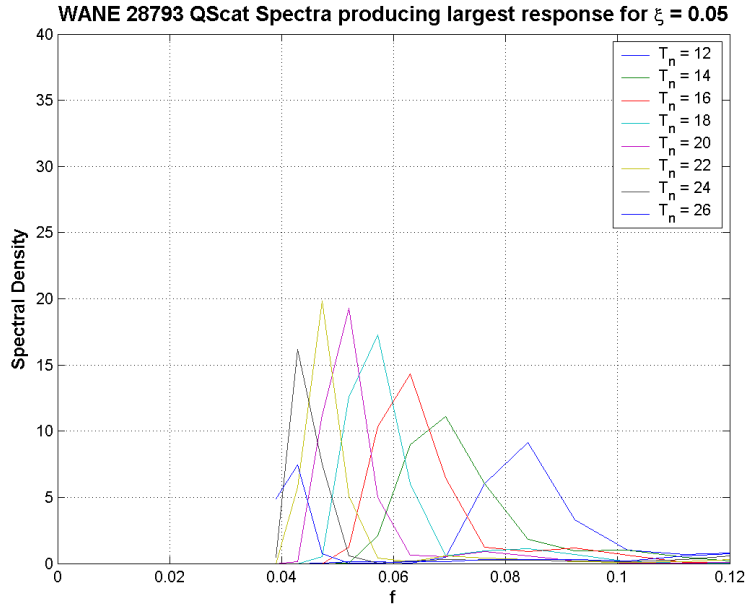

WANE 28701 QScat Spectra producing largest response for T_n = 20
Spectral Density
f
ξ = 0.05
ξ = 0.10
ξ = 0.15
ξ = 0.20
ξ = 0.25
ξ = 0.30

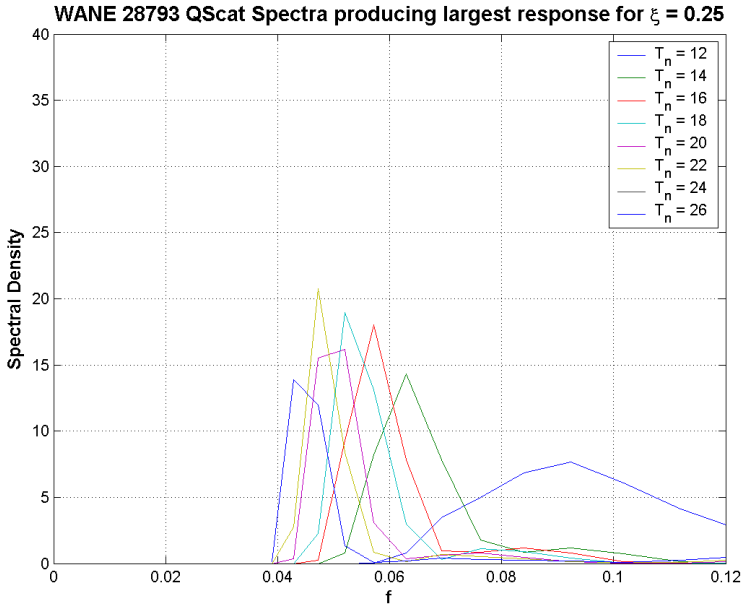

WANE 28701 QScat Spectra producing largest response for ξ = 0.05
Spectral Density
f
T_n = 12
T_n = 14
T_n = 16
T_n = 18
T_n = 20
T_n = 22
T_n = 24
T_n = 26


WANE 28701 QScat Spectra producing largest response for ξ = 0.25
Spectral Density
f
T_n = 12
T_n = 14
T_n = 16
T_n = 18
T_n = 20
T_n = 22
T_n = 24
T_n = 26


Maximum rms Response to WANE 28793 QScat
Response
T_n
ξ = 0.05
ξ = 0.10
ξ = 0.15
ξ = 0.20
ξ = 0.25
ξ = 0.30


WANE 28793 QScat Spectra producing largest response for T_n = 20
Spectral Density
f
ξ = 0.05
ξ = 0.10
ξ = 0.15
ξ = 0.20
ξ = 0.25
ξ = 0.30

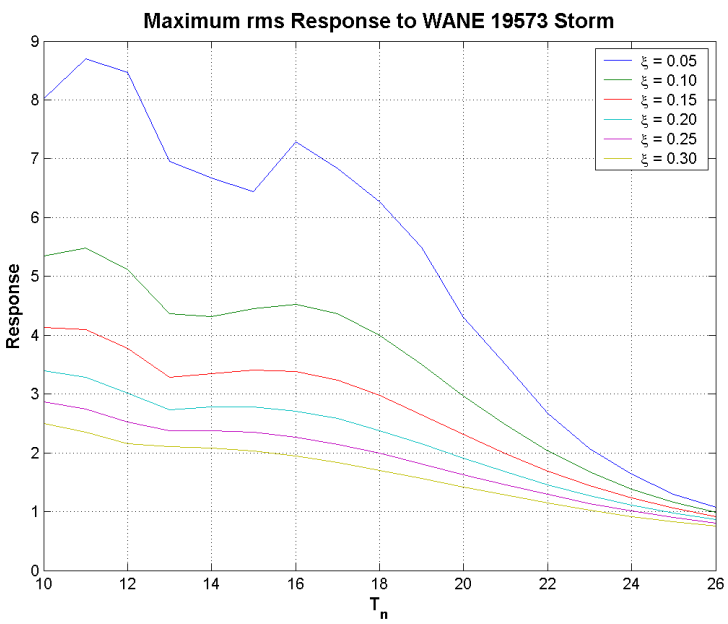

WANE 28793 QScat Spectra producing largest response for ξ = 0.05
Spectral Density
f
T_n = 12
T_n = 14
T_n = 16
T_n = 18
T_n = 20
T_n = 22
T_n = 24
T_n = 26

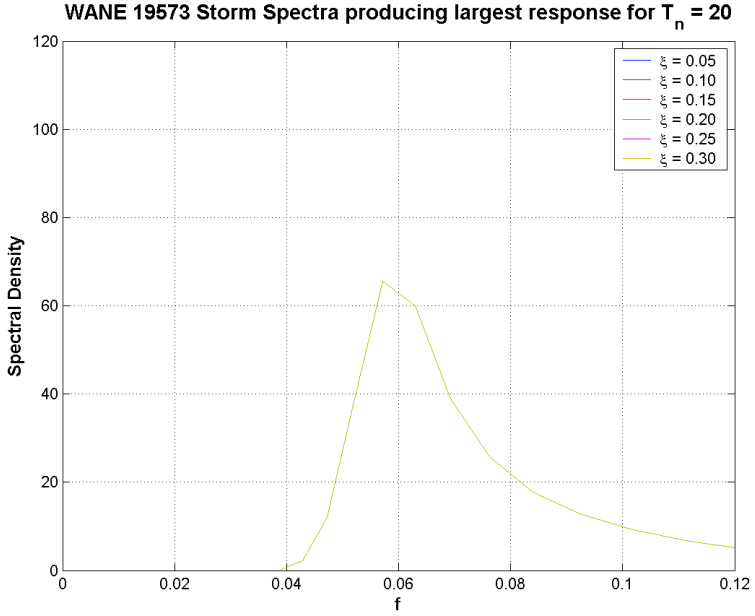

WANE 28793 QScat Spectra producing largest response for ξ = 0.25
Spectral Density
f
T_n = 12
T_n = 14
T_n = 16
T_n = 18
T_n = 20
T_n = 22
T_n = 24
T_n = 26

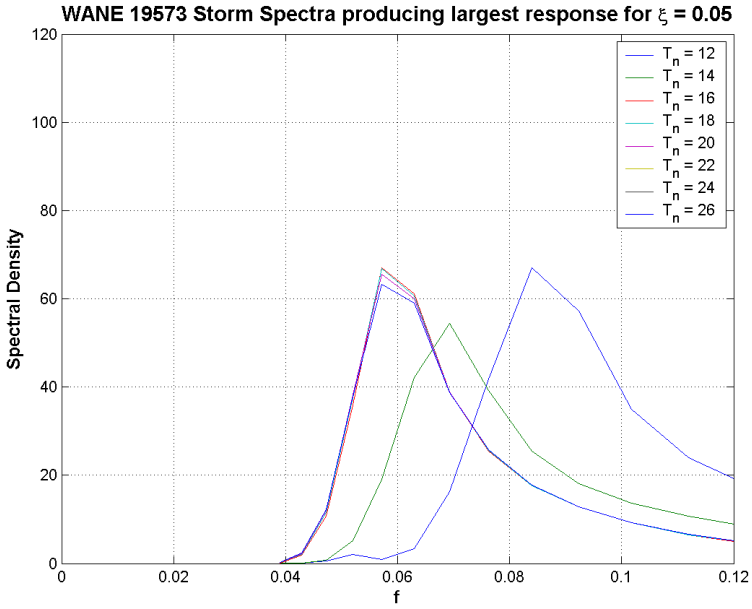
Appendix 7.3

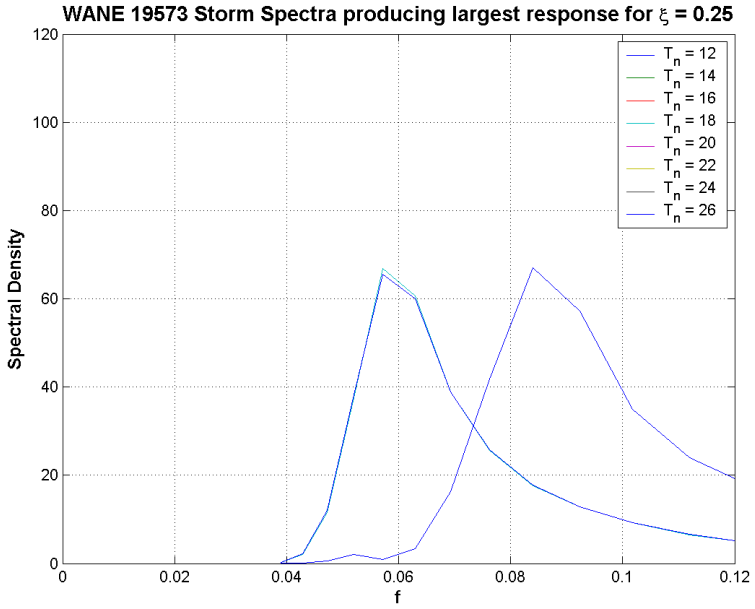
Maximum rms Responses and Associated Spectra

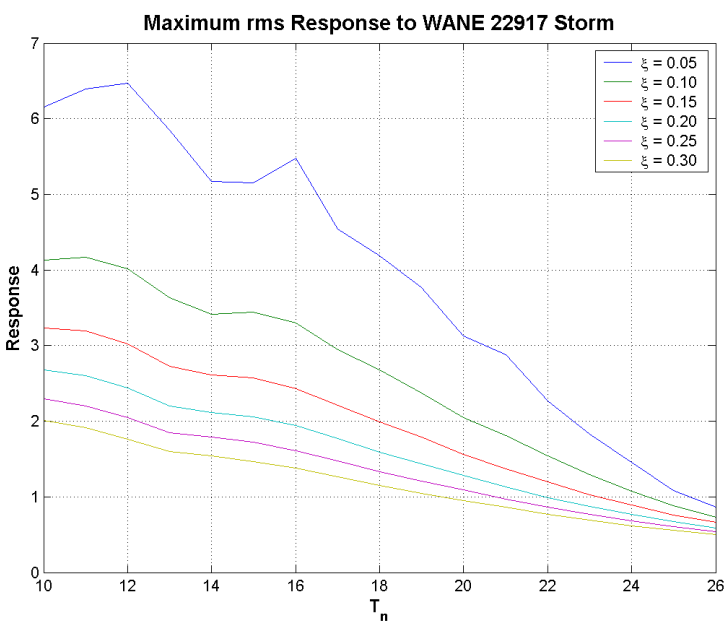
WANE Storm Data

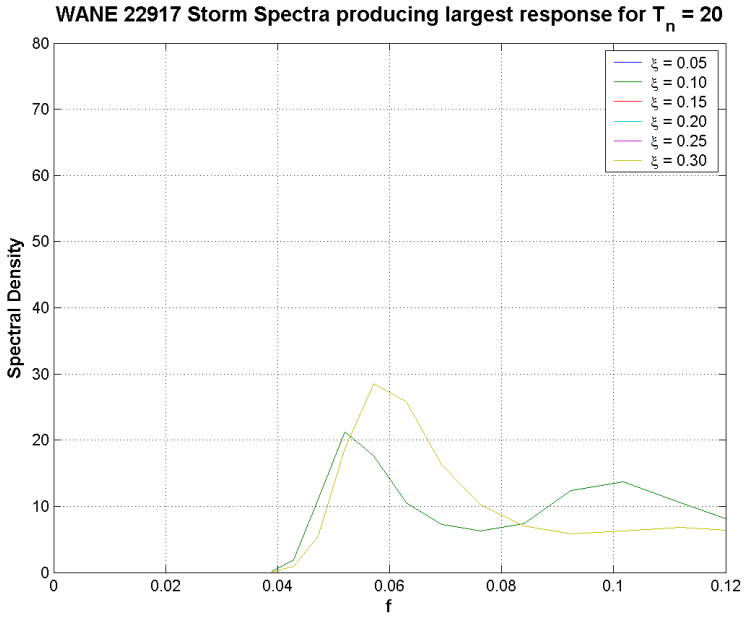

Maximum rms Response to WANE 19573 Storm
Response
T_n
ξ = 0.05
ξ = 0.10
ξ = 0.15
ξ = 0.20
ξ = 0.25
ξ = 0.30

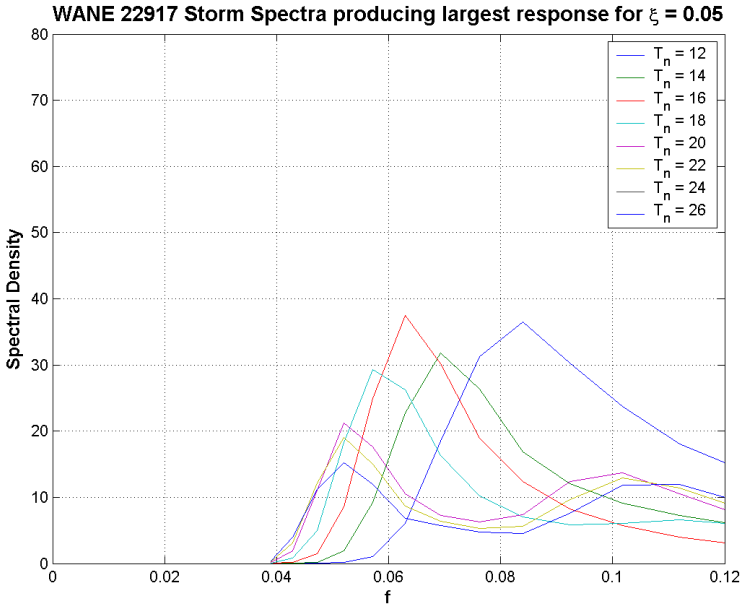

WANE 19573 Storm Spectra producing largest response for T_n = 20
Spectral Density
f
ξ = 0.05
ξ = 0.10
ξ = 0.15
ξ = 0.20
ξ = 0.25
ξ = 0.30

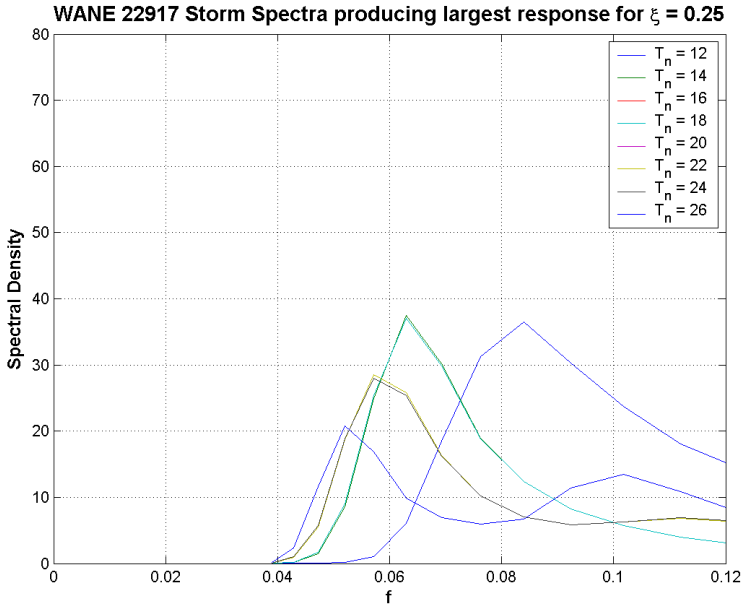

WANE 19573 Storm Spectra producing largest response for ξ = 0.05
Spectral Density
f
T_n = 12
T_n = 14
T_n = 16
T_n = 18
T_n = 20
T_n = 22
T_n = 24
T_n = 26

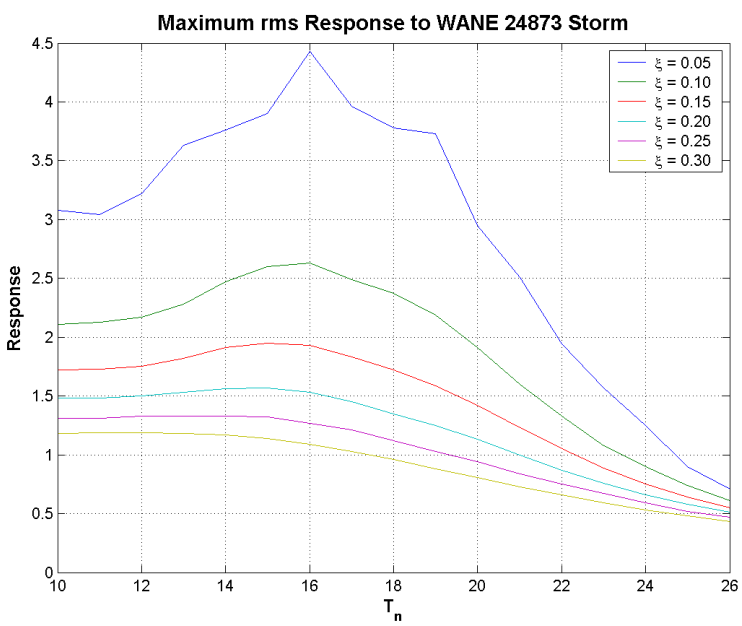

WANE 19573 Storm Spectra producing largest response for ξ = 0.25
Spectral Density
f
T_n = 12
T_n = 14
T_n = 16
T_n = 18
T_n = 20
T_n = 22
T_n = 24
T_n = 26

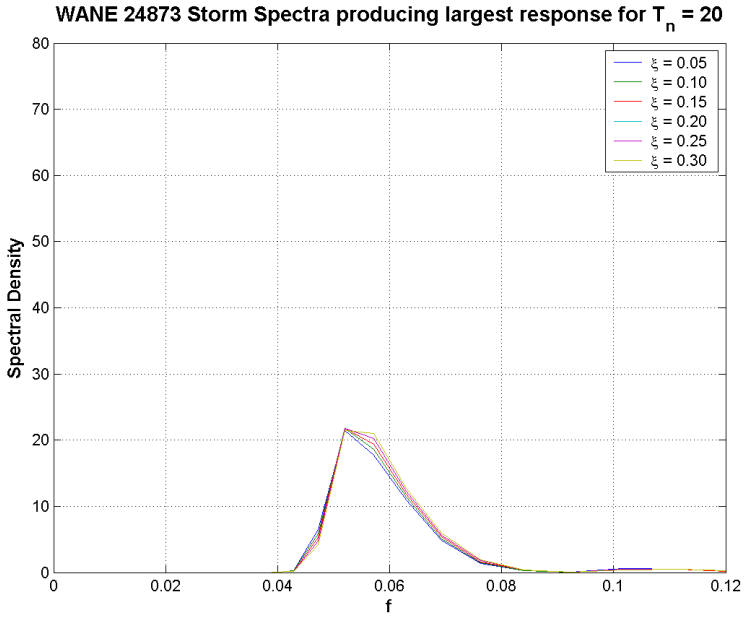

Maximum rms Response to WANE 22917 Storm
Response
T_n
ξ = 0.05
ξ = 0.10
ξ = 0.15
ξ = 0.20
ξ = 0.25
ξ = 0.30

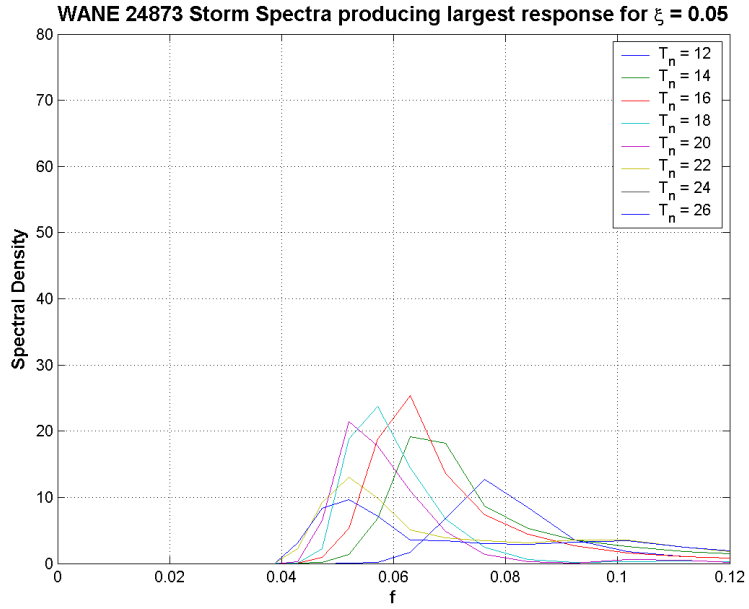

WANE 22917 Storm Spectra producing largest response for T_n = 20
Spectral Density
f
ξ = 0.05
ξ = 0.10
ξ = 0.15
ξ = 0.20
ξ = 0.25
ξ = 0.30

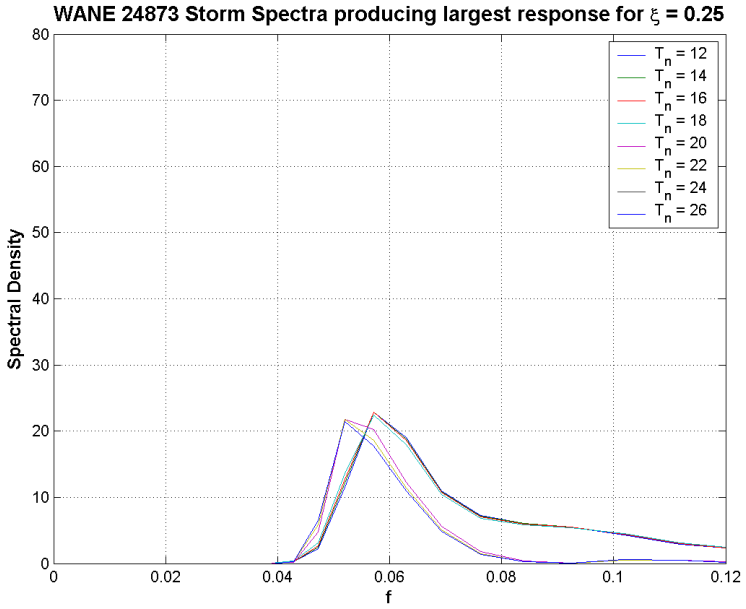

WANE 22917 Storm Spectra producing largest response for ξ = 0.05
Spectral Density
f
T_n = 12
T_n = 14
T_n = 16
T_n = 18
T_n = 20
T_n = 22
T_n = 24
T_n = 26

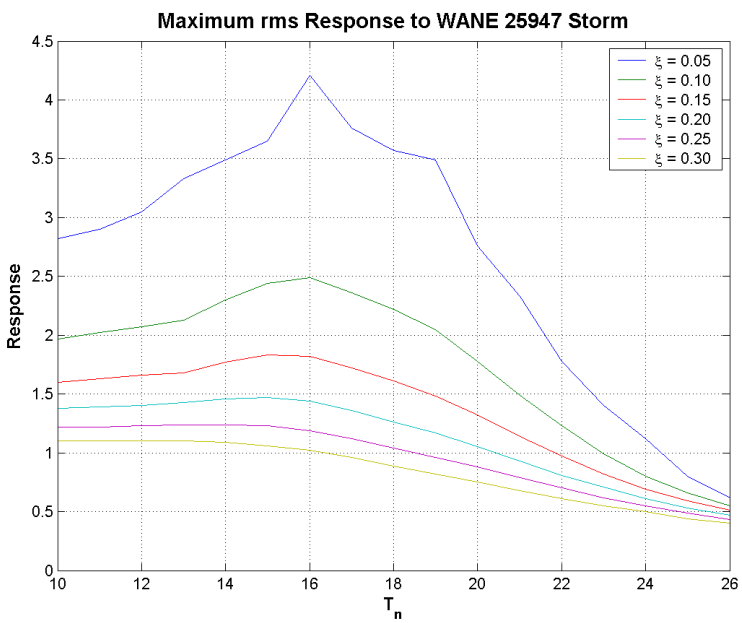

WANE 22917 Storm Spectra producing largest response for ξ = 0.25
Spectral Density
f
T_n = 12
T_n = 14
T_n = 16
T_n = 18
T_n = 20
T_n = 22
T_n = 24
T_n = 26

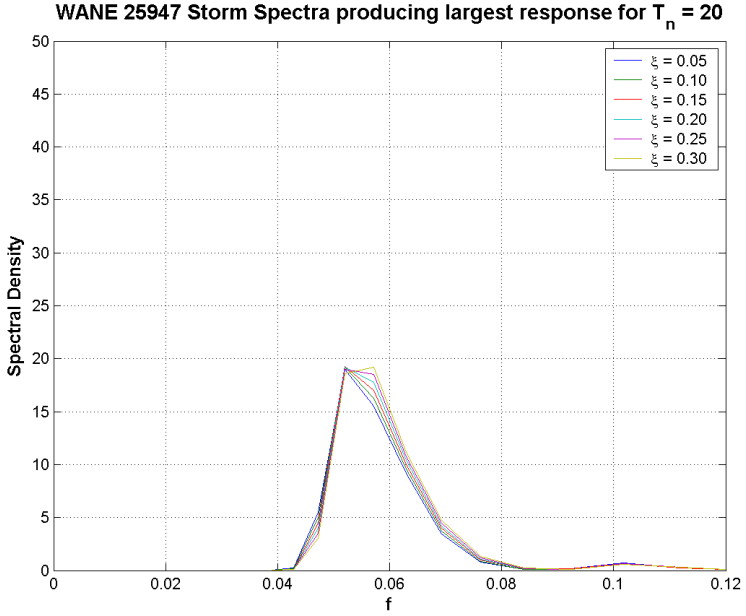

Maximum rms Response to WANE 24873 Storm
Response
T_n
ξ = 0.05
ξ = 0.10
ξ = 0.15
ξ = 0.20
ξ = 0.25
ξ = 0.30

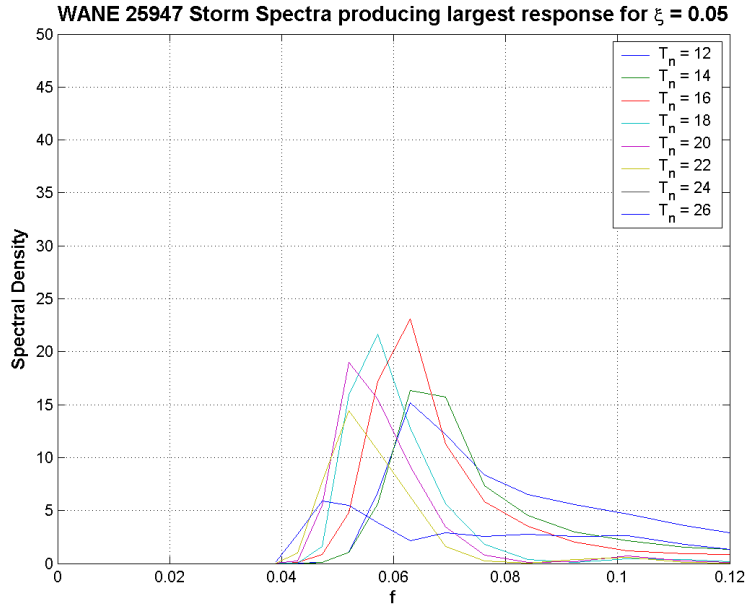

WANE 24873 Storm Spectra producing largest response for T_n = 20
Spectral Density
f
ξ = 0.05
ξ = 0.10
ξ = 0.15
ξ = 0.20
ξ = 0.25
ξ = 0.30

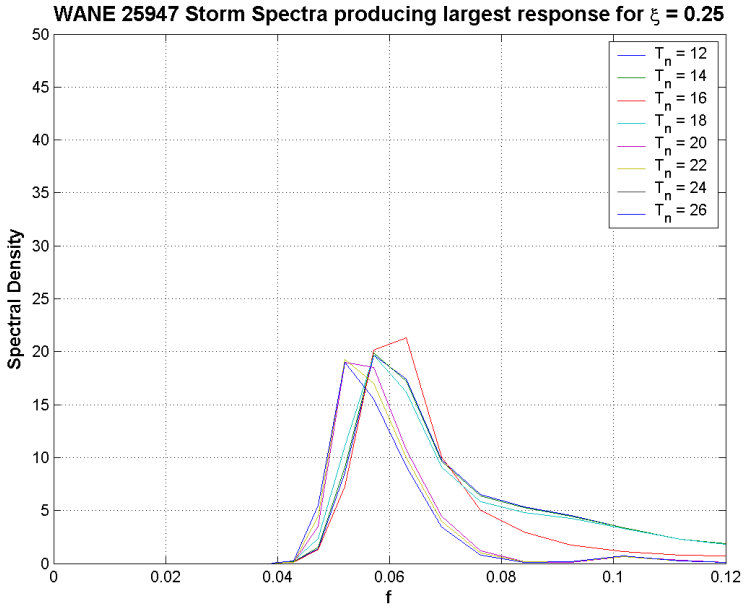

WANE 24873 Storm Spectra producing largest response for ξ = 0.05
Spectral Density
f
T_n = 12
T_n = 14
T_n = 16
T_n = 18
T_n = 20
T_n = 22
T_n = 24
T_n = 26

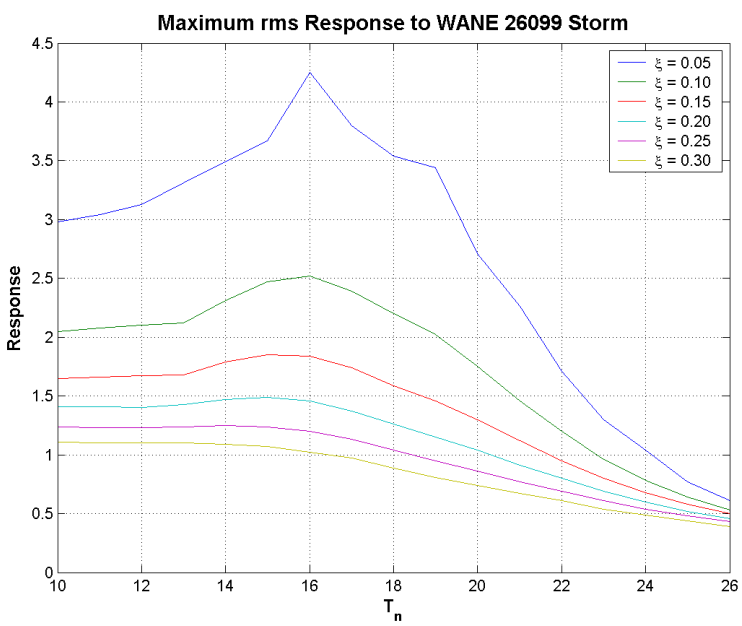

WANE 24873 Storm Spectra producing largest response for ξ = 0.25
Spectral Density
f
T_n = 12
T_n = 14
T_n = 16
T_n = 18
T_n = 20
T_n = 22
T_n = 24
T_n = 26

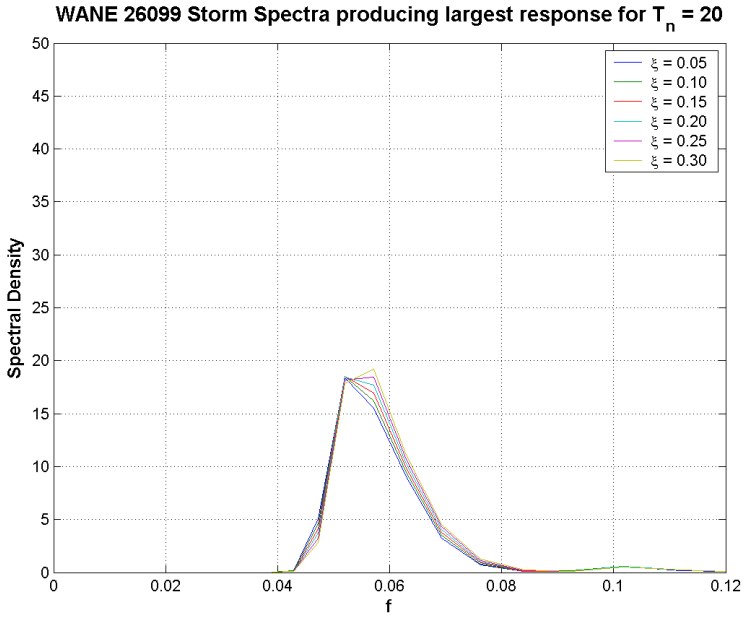

Maximum rms Response to WANE 25947 Storm
Response
T_n
ξ = 0.05
ξ = 0.10
ξ = 0.15
ξ = 0.20
ξ = 0.25
ξ = 0.30

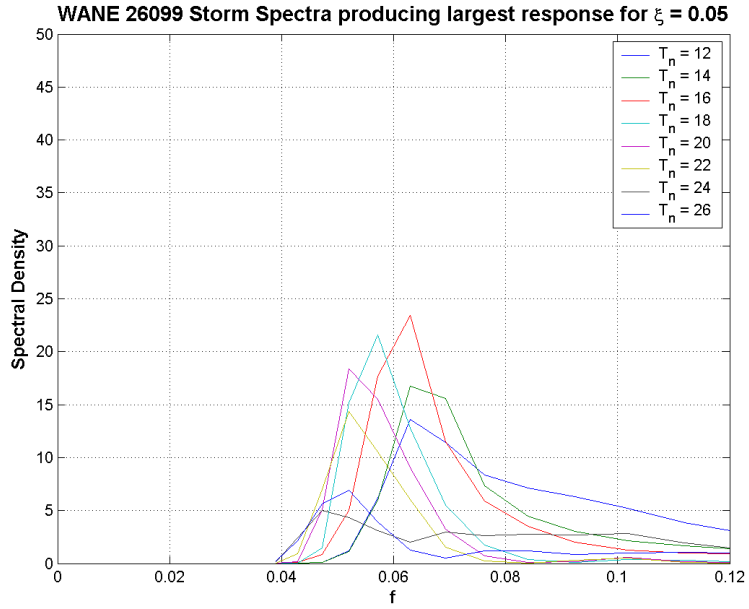

WANE 25947 Storm Spectra producing largest response for T_n = 20
Spectral Density
f
ξ = 0.05
ξ = 0.10
ξ = 0.15
ξ = 0.20
ξ = 0.25
ξ = 0.30

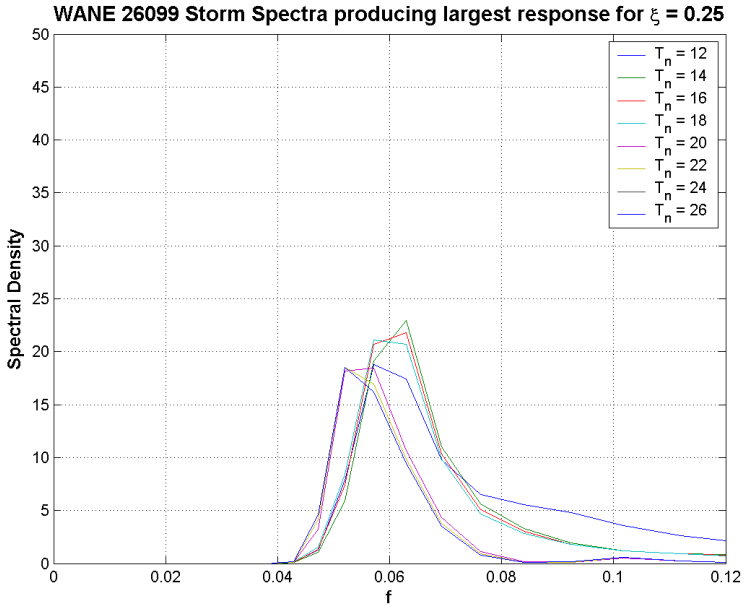

WANE 25947 Storm Spectra producing largest response for ξ = 0.05
Spectral Density
f
T_n = 12
T_n = 14
T_n = 16
T_n = 18
T_n = 20
T_n = 22
T_n = 24
T_n = 26

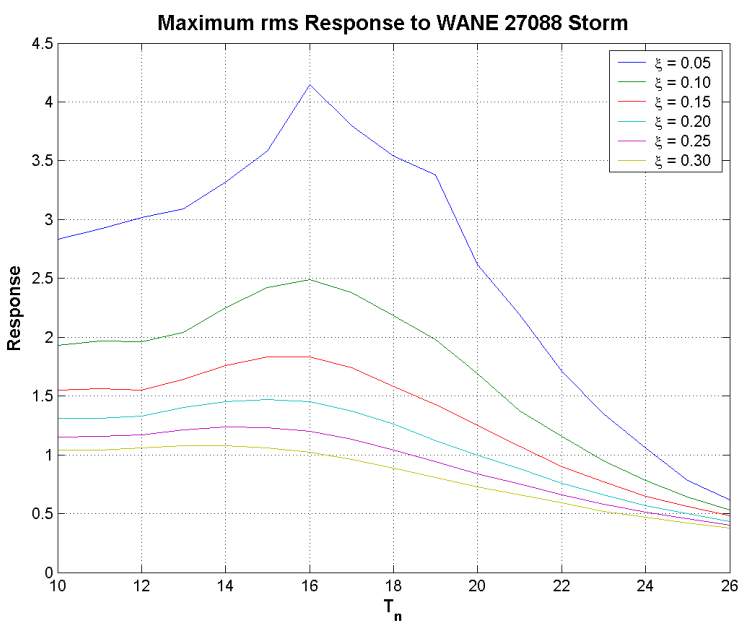

WANE 25947 Storm Spectra producing largest response for ξ = 0.25
Spectral Density
f
T_n = 12
T_n = 14
T_n = 16
T_n = 18
T_n = 20
T_n = 22
T_n = 24
T_n = 26

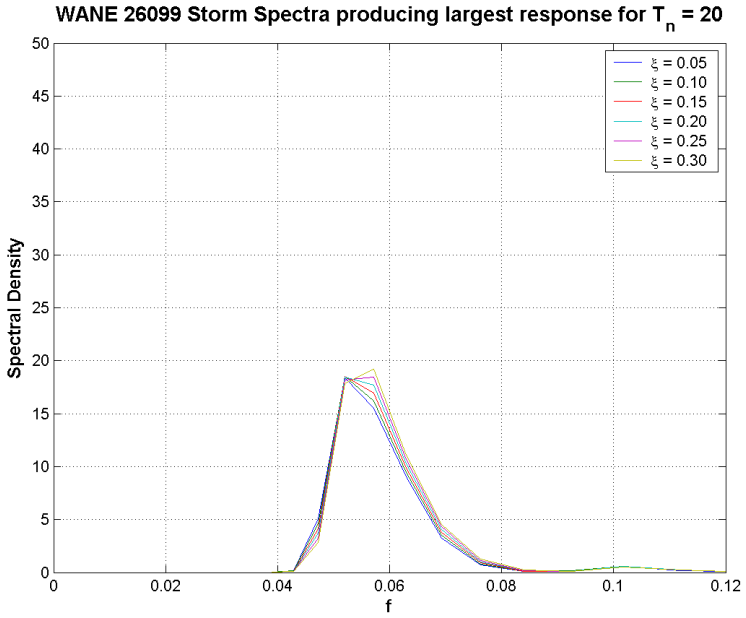

Maximum rms Response to WANE 26099 Storm
Response
T_n
ξ = 0.05
ξ = 0.10
ξ = 0.15
ξ = 0.20
ξ = 0.25
ξ = 0.30

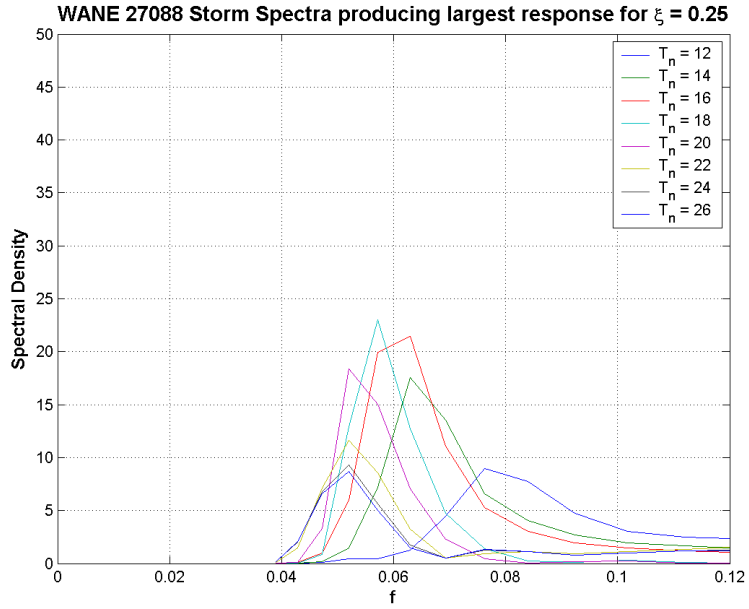

WANE 26099 Storm Spectra producing largest response for T_n = 20
Spectral Density
f
ξ = 0.05
ξ = 0.10
ξ = 0.15
ξ = 0.20
ξ = 0.25
ξ = 0.30

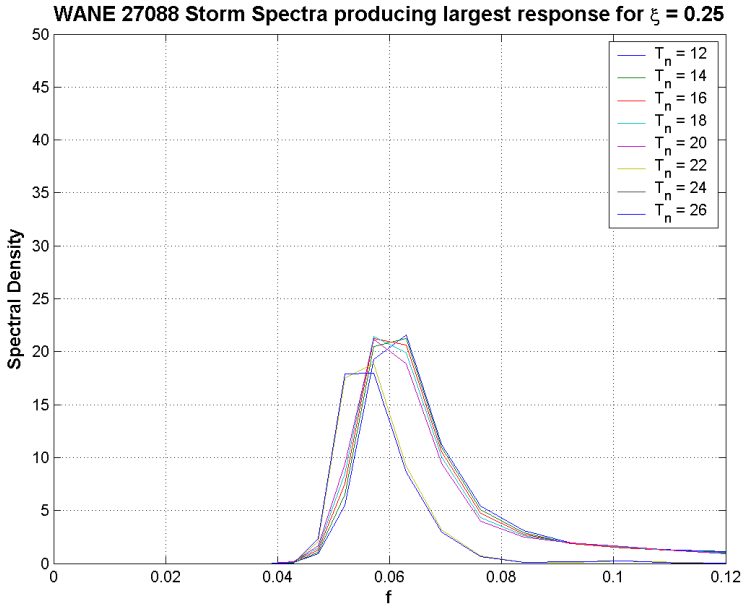

WANE 26099 Storm Spectra producing largest response for ξ = 0.05
Spectral Density
f
T_n = 12
T_n = 14
T_n = 16
T_n = 18
T_n = 20
T_n = 22
T_n = 24
T_n = 26

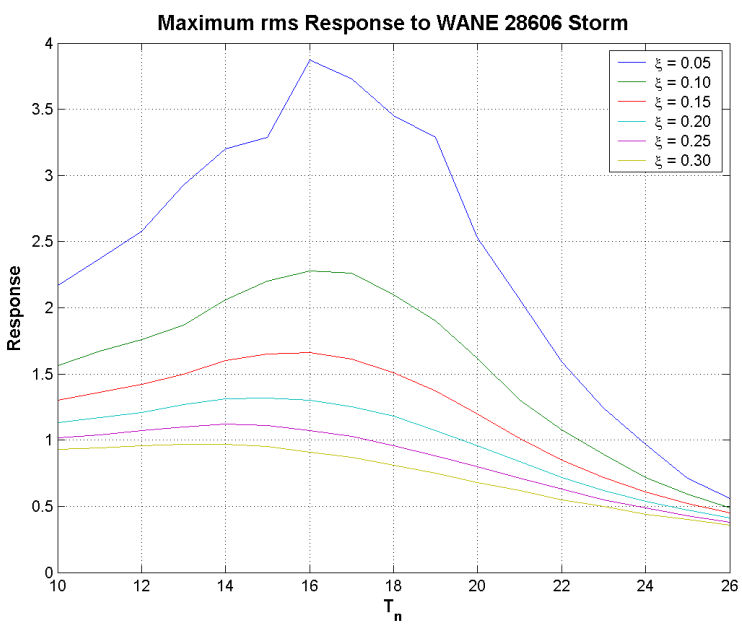

WANE 26099 Storm Spectra producing largest response for ξ = 0.25
Spectral Density
f
T_n = 12
T_n = 14
T_n = 16
T_n = 18
T_n = 20
T_n = 22
T_n = 24
T_n = 26

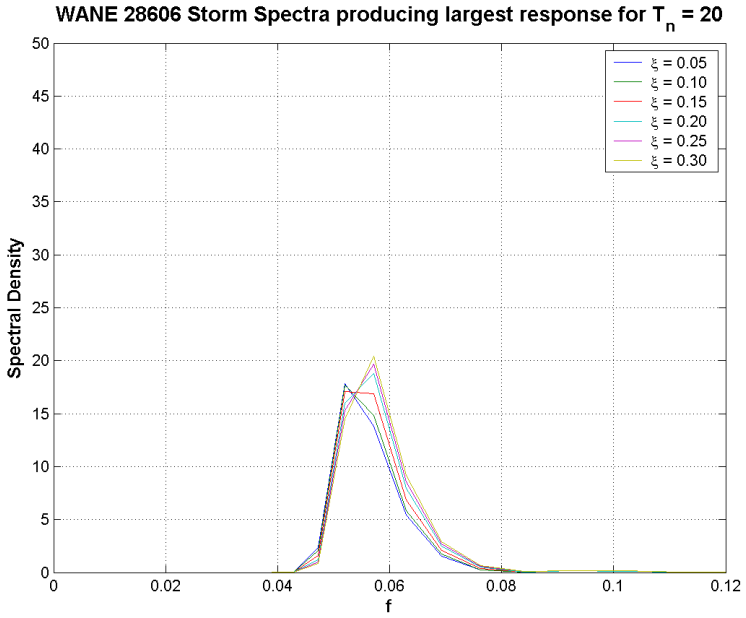

Maximum rms Response to WANE 27088 Storm
Response
T_n
ξ = 0.05
ξ = 0.10
ξ = 0.15
ξ = 0.20
ξ = 0.25
ξ = 0.30

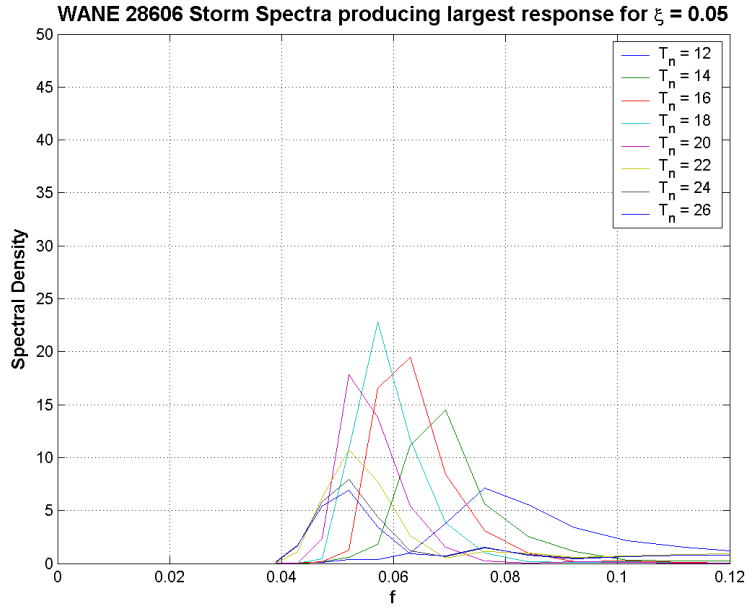

WANE 26099 Storm Spectra producing largest response for T_n = 20
Spectral Density
f
ξ = 0.05
ξ = 0.10
ξ = 0.15
ξ = 0.20
ξ = 0.25
ξ = 0.30

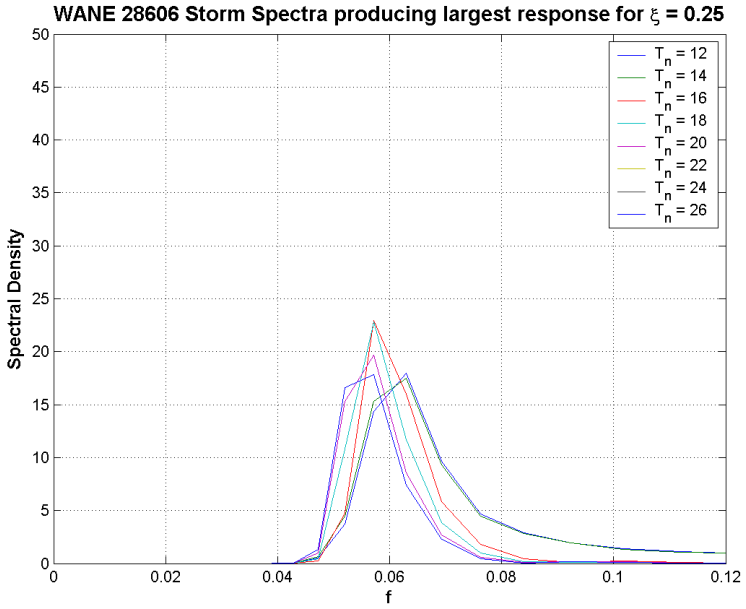

WANE 27088 Storm Spectra producing largest response for ξ = 0.25
Spectral Density
f
T_n = 12
T_n = 14
T_n = 16
T_n = 18
T_n = 20
T_n = 22
T_n = 24
T_n = 26

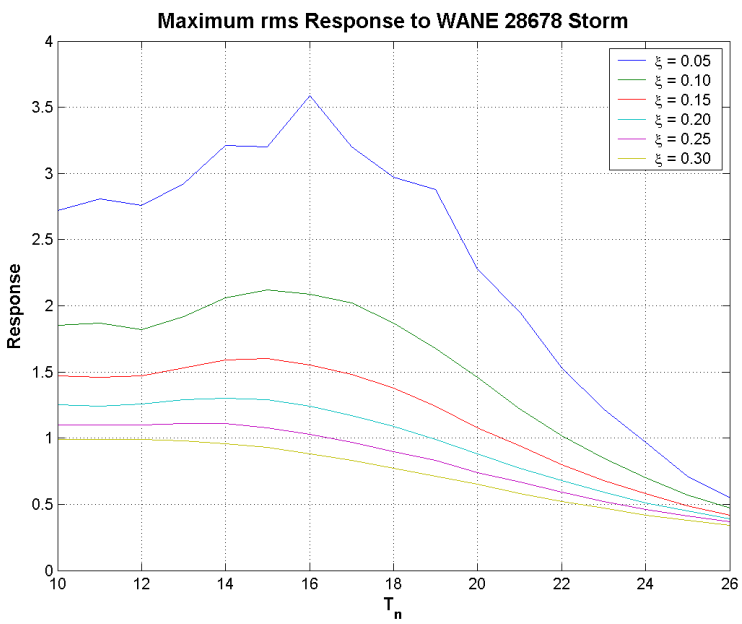

WANE 27088 Storm Spectra producing largest response for ξ = 0.25
Spectral Density
f
T_n = 12
T_n = 14
T_n = 16
T_n = 18
T_n = 20
T_n = 22
T_n = 24
T_n = 26

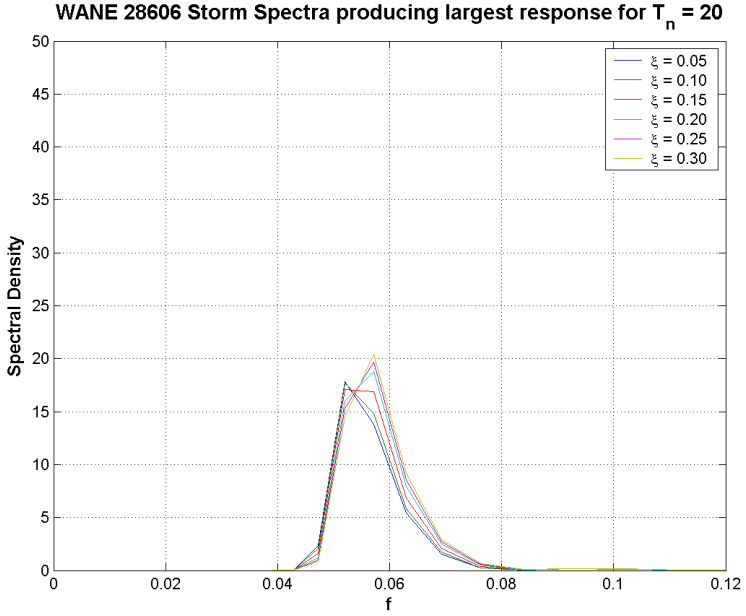

Maximum rms Response to WANE 28606 Storm
Response
T_n
ξ = 0.05
ξ = 0.10
ξ = 0.15
ξ = 0.20
ξ = 0.25
ξ = 0.30

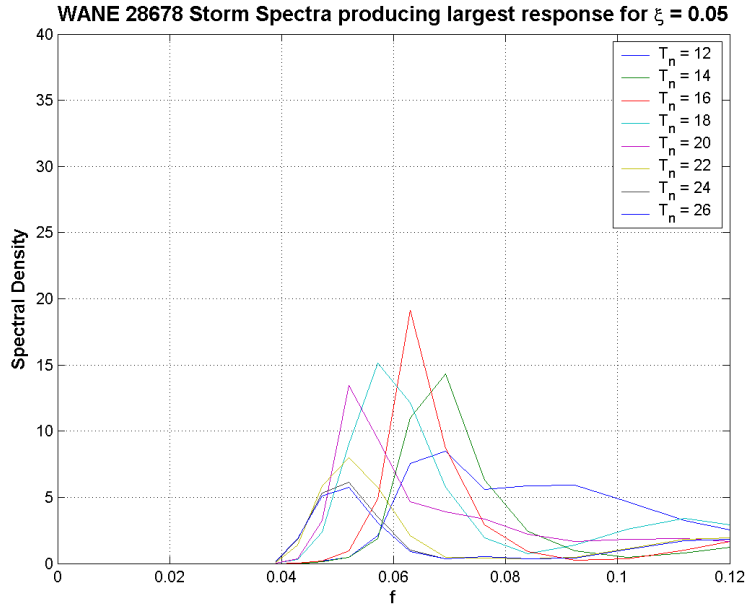

WANE 28606 Storm Spectra producing largest response for T_n = 20
Spectral Density
f
ξ = 0.05
ξ = 0.10
ξ = 0.15
ξ = 0.20
ξ = 0.25
ξ = 0.30

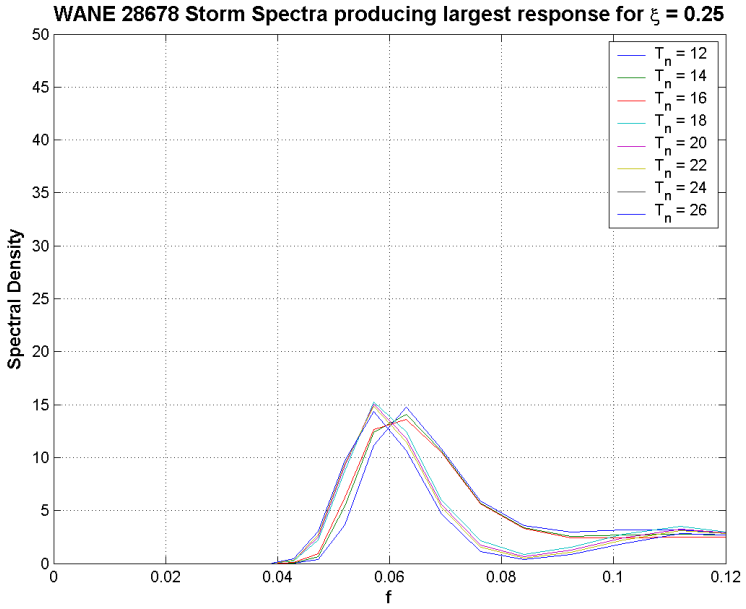

WANE 28606 Storm Spectra producing largest response for ξ = 0.05
Spectral Density
f
T_n = 12
T_n = 14
T_n = 16
T_n = 18
T_n = 20
T_n = 22
T_n = 24
T_n = 26

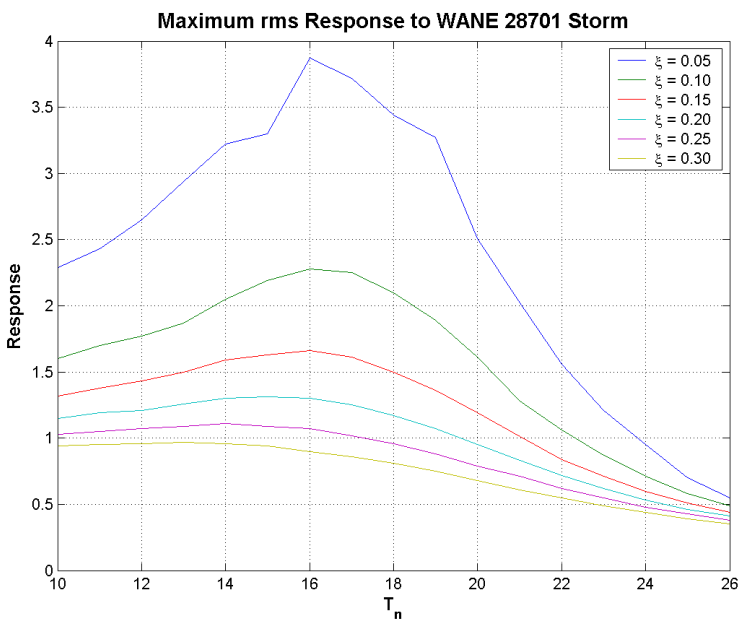

WANE 28606 Storm Spectra producing largest response for ξ = 0.25
Spectral Density
f
T_n = 12
T_n = 14
T_n = 16
T_n = 18
T_n = 20
T_n = 22
T_n = 24
T_n = 26

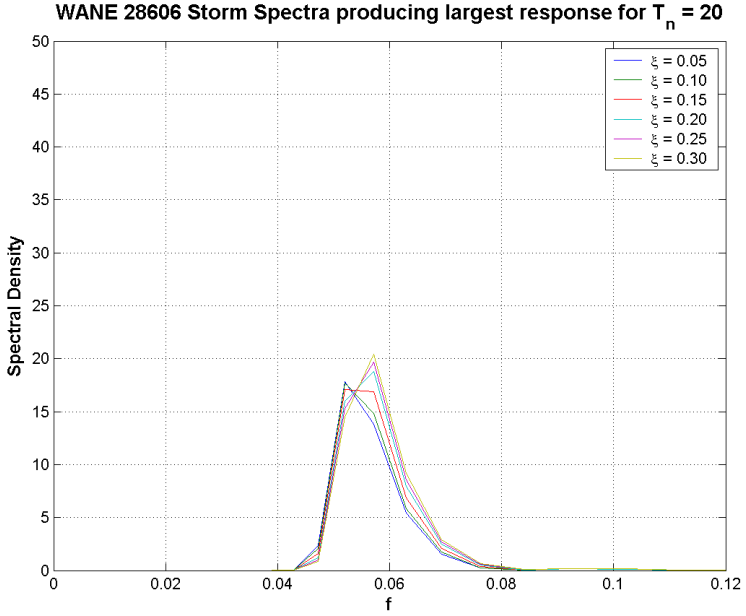

Maximum rms Response to WANE 28678 Storm
Response
T_n
ξ = 0.05
ξ = 0.10
ξ = 0.15
ξ = 0.20
ξ = 0.25
ξ = 0.30

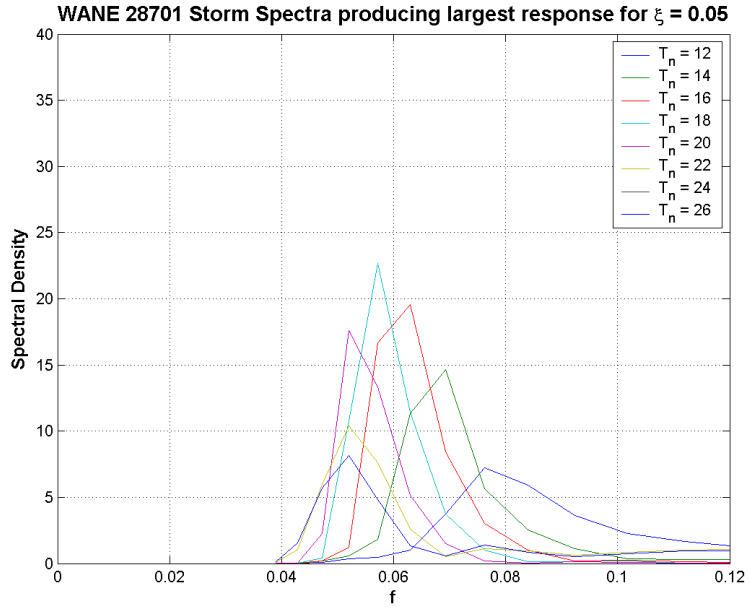

WANE 28606 Storm Spectra producing largest response for T_n = 20
Spectral Density
f
ξ = 0.05
ξ = 0.10
ξ = 0.15
ξ = 0.20
ξ = 0.25
ξ = 0.30

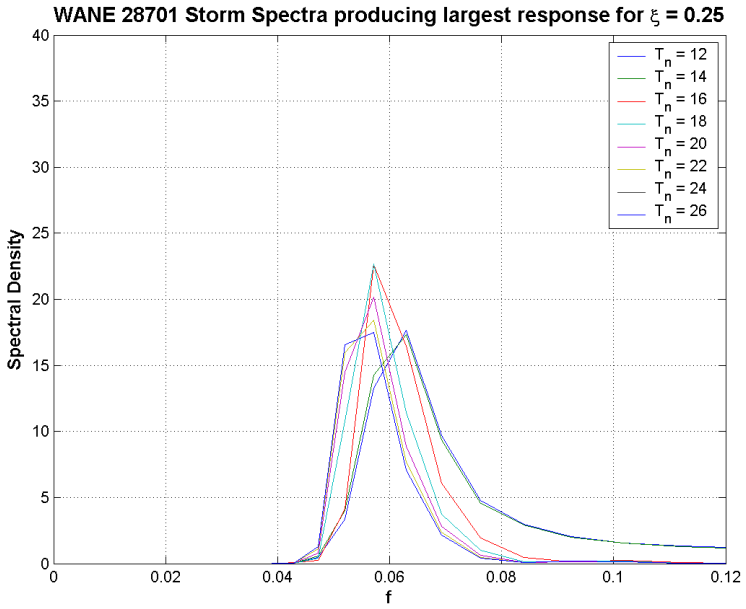

WANE 28678 Storm Spectra producing largest response for ξ = 0.05
Spectral Density
f
T_n = 12
T_n = 14
T_n = 16
T_n = 18
T_n = 20
T_n = 22
T_n = 24
T_n = 26

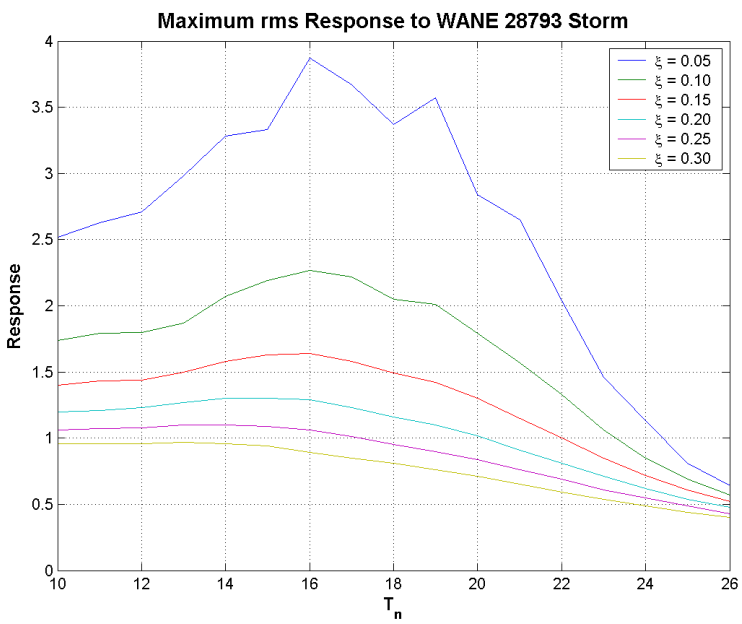

WANE 28678 Storm Spectra producing largest response for ξ = 0.25
Spectral Density
f
T_n = 12
T_n = 14
T_n = 16
T_n = 18
T_n = 20
T_n = 22
T_n = 24
T_n = 26

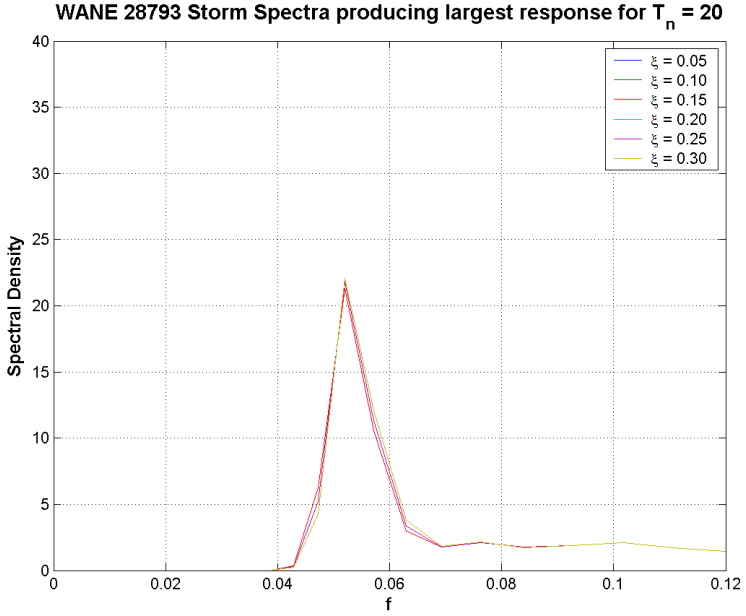

Maximum rms Response to WANE 28701 Storm
Response
T_n
ξ = 0.05
ξ = 0.10
ξ = 0.15
ξ = 0.20
ξ = 0.25
ξ = 0.30

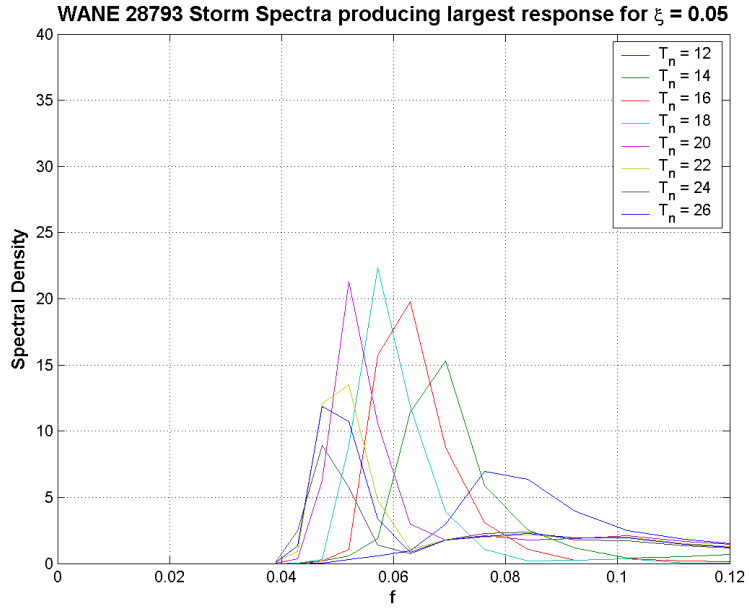

WANE 28606 Storm Spectra producing largest response for T_n = 20
Spectral Density
f
ξ = 0.05
ξ = 0.10
ξ = 0.15
ξ = 0.20
ξ = 0.25
ξ = 0.30

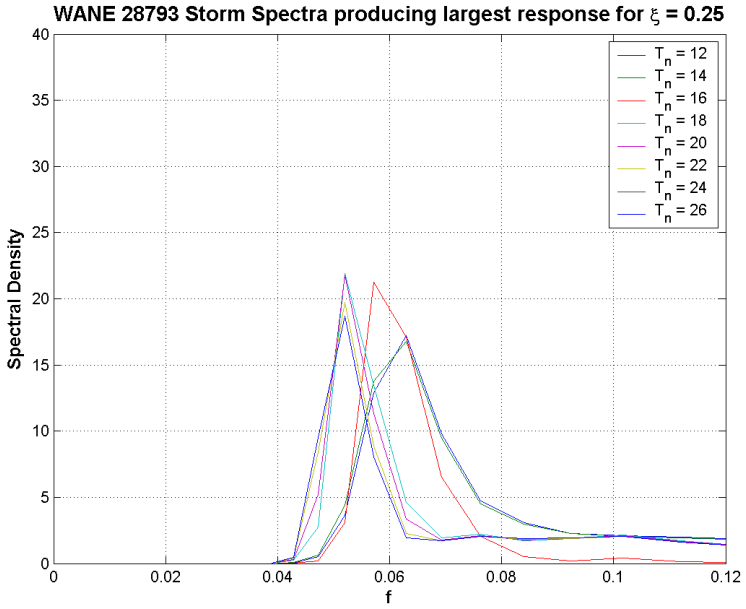

WANE 28701 Storm Spectra producing largest response for ξ = 0.05
Spectral Density
f
T_n = 12
T_n = 14
T_n = 16
T_n = 18
T_n = 20
T_n = 22
T_n = 24
T_n = 26


WANE 28701 Storm Spectra producing largest response for ξ = 0.25
Spectral Density
f
T_n = 12
T_n = 14
T_n = 16
T_n = 18
T_n = 20
T_n = 22
T_n = 24
T_n = 26


Maximum rms Response to WANE 28793 Storm
Response
T_n
ξ = 0.05
ξ = 0.10
ξ = 0.15
ξ = 0.20
ξ = 0.25
ξ = 0.30


WANE 28793 Storm Spectra producing largest response for T_n = 20
Spectral Density
f
ξ = 0.05
ξ = 0.10
ξ = 0.15
ξ = 0.20
ξ = 0.25
ξ = 0.30

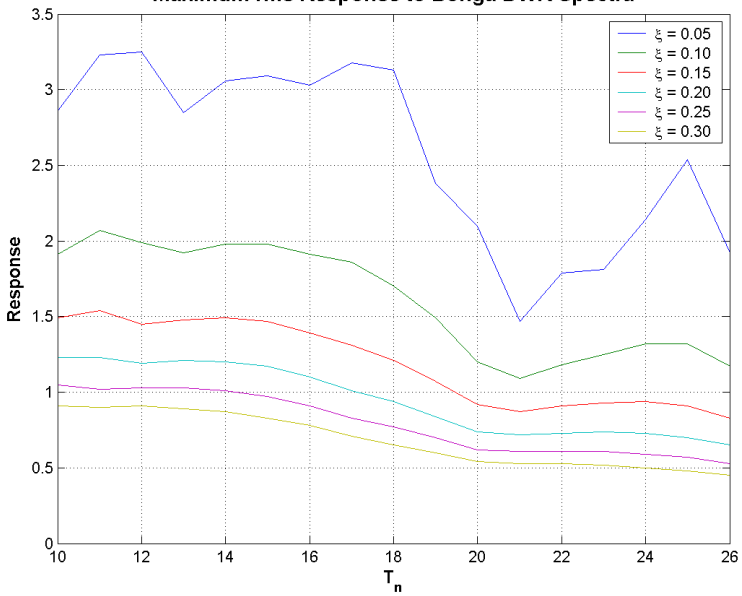

WANE 28793 Storm Spectra producing largest response for ξ = 0.05
Spectral Density
f
T_n = 12
T_n = 14
T_n = 16
T_n = 18
T_n = 20
T_n = 22
T_n = 24
T_n = 26

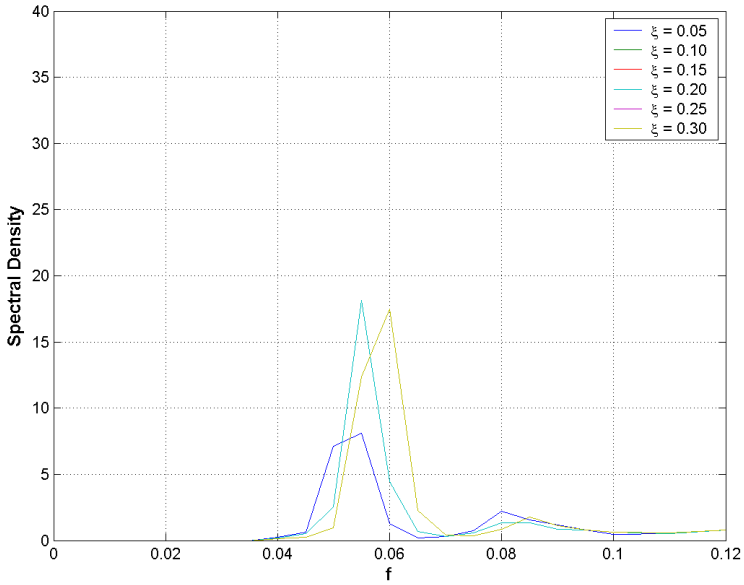

WANE 28793 Storm Spectra producing largest response for ξ = 0.25
Spectral Density
f
T_n = 12
T_n = 14
T_n = 16
T_n = 18
T_n = 20
T_n = 22
T_n = 24
T_n = 26

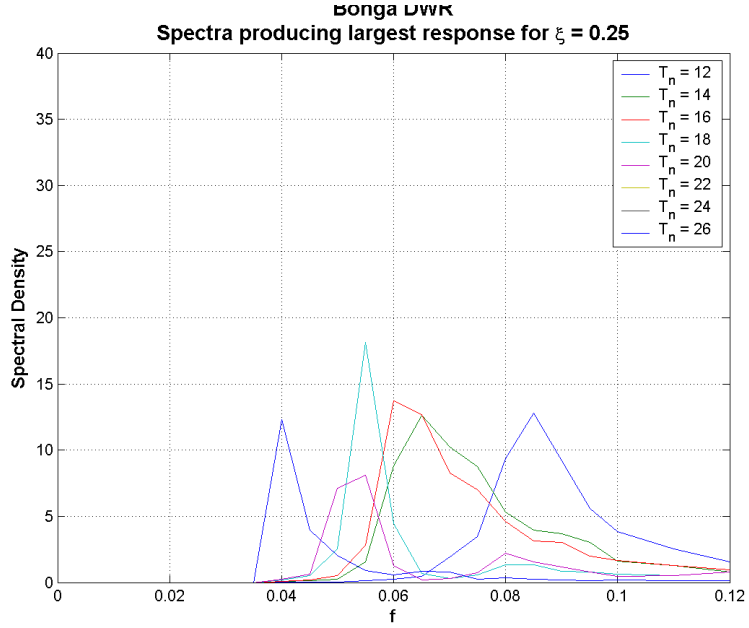
Appendix 7.4

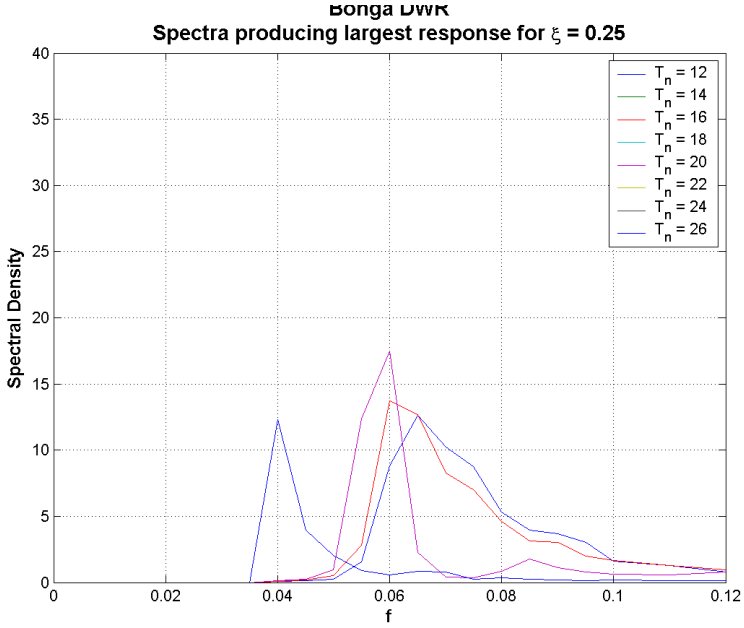
Maximum rms Responses and Associated Spectra

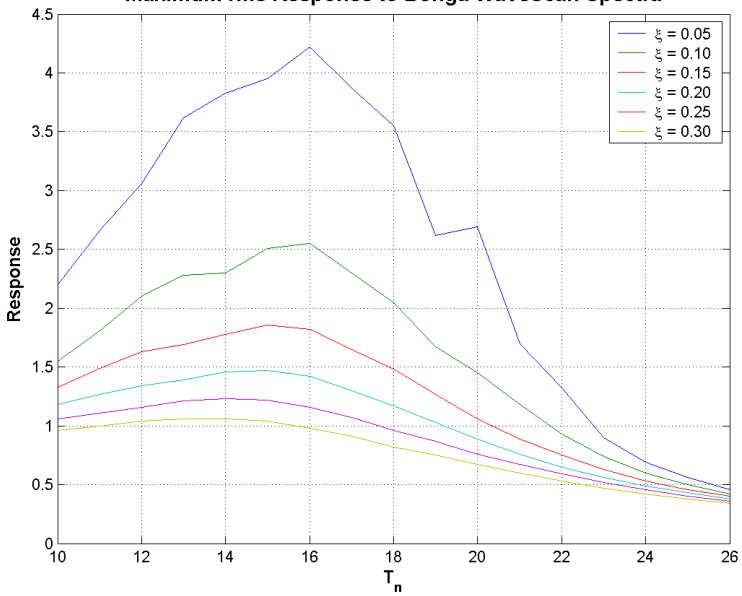
Measured Data

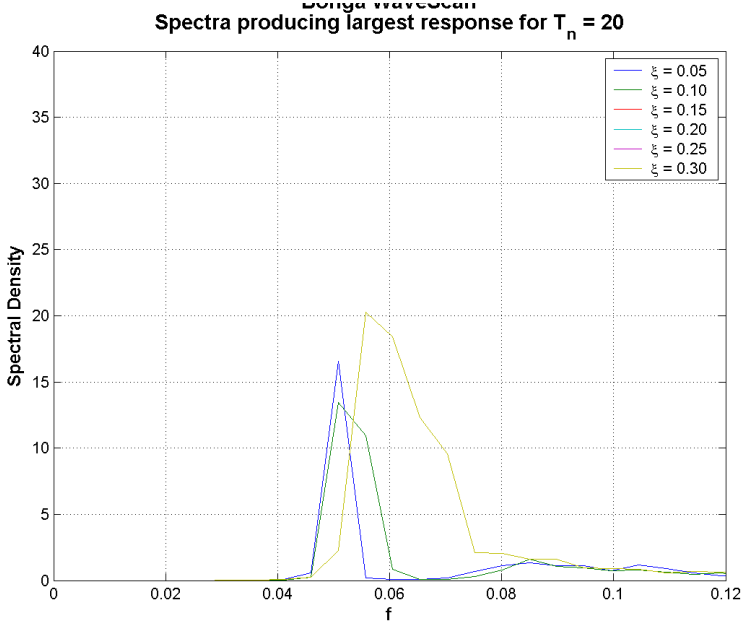

Maximum rms Response to Bonga DWR Spectra
Response
T_n
ξ = 0.05
ξ = 0.10
ξ = 0.15
ξ = 0.20
ξ = 0.25
ξ = 0.30

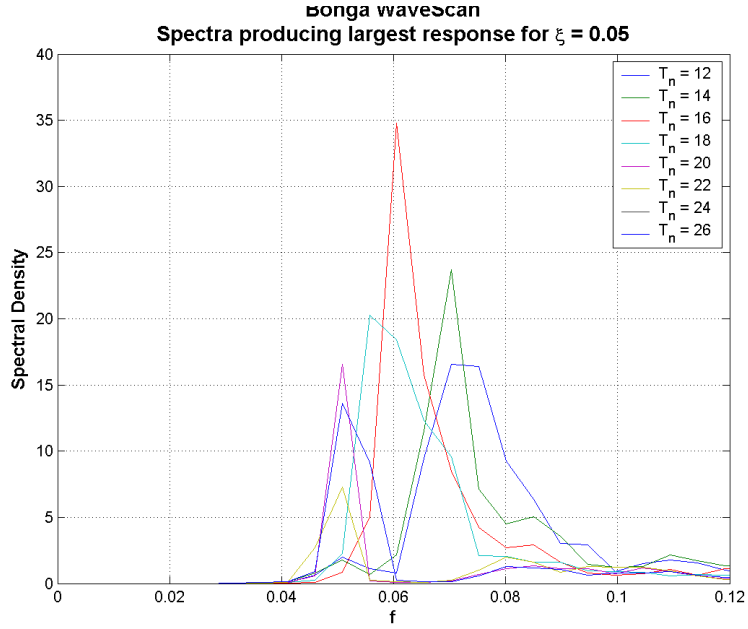

Bonga DWR
Spectra producing largest response for T_n = 20
Spectral Density
f
ξ = 0.05
ξ = 0.10
ξ = 0.15
ξ = 0.20
ξ = 0.25
ξ = 0.30

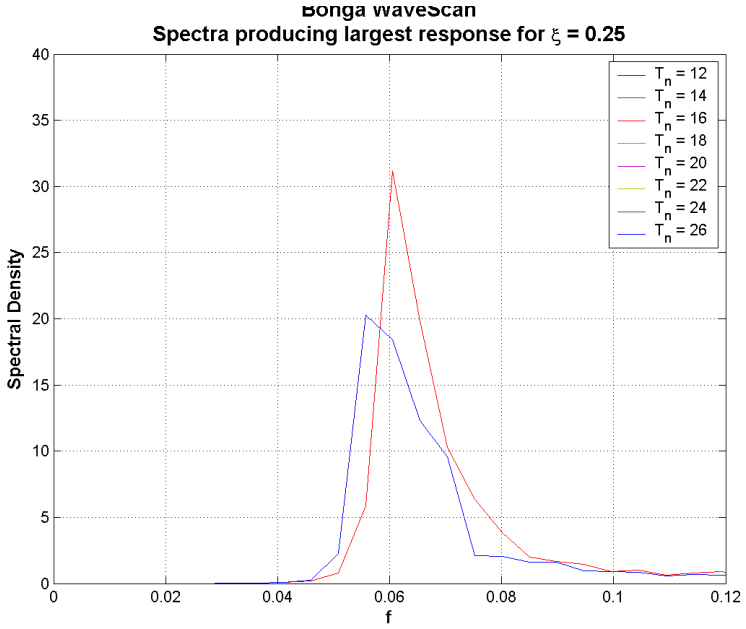

Bonga DWR
Spectra producing largest response for ξ = 0.25
Spectral Density
f
T_n = 12
T_n = 14
T_n = 16
T_n = 18
T_n = 20
T_n = 22
T_n = 24
T_n = 26

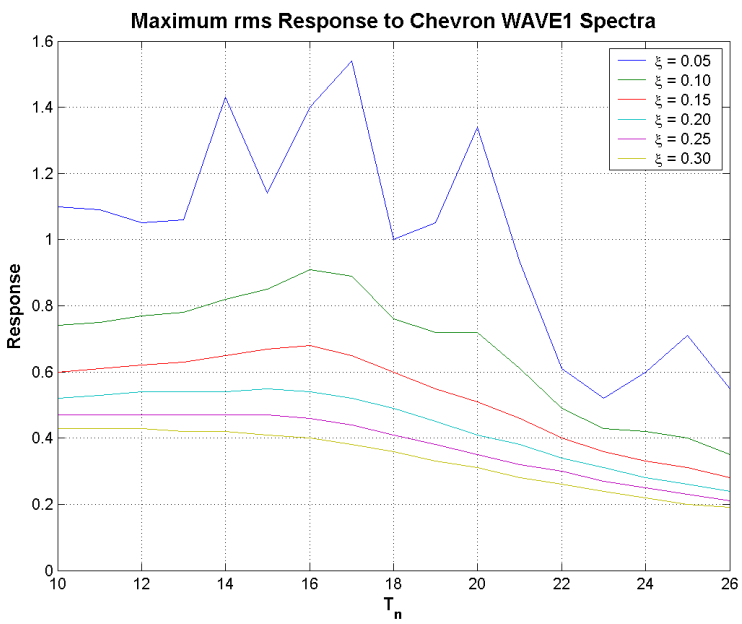

Bonga DWR
Spectra producing largest response for ξ = 0.25
Spectral Density
f
T_n = 12
T_n = 14
T_n = 16
T_n = 18
T_n = 20
T_n = 22
T_n = 24
T_n = 26

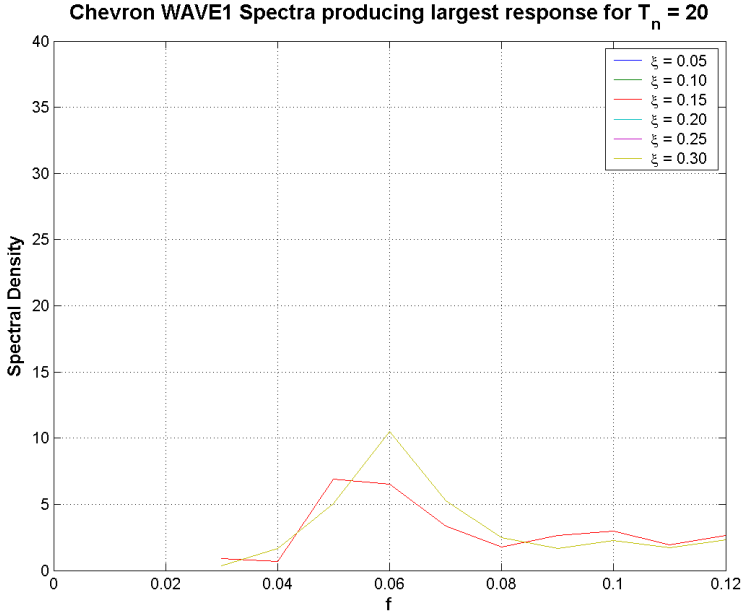

Maximum rms Response to Bonga WaveScan Spectra
Response
T_n
ξ = 0.05
ξ = 0.10
ξ = 0.15
ξ = 0.20
ξ = 0.25
ξ = 0.30

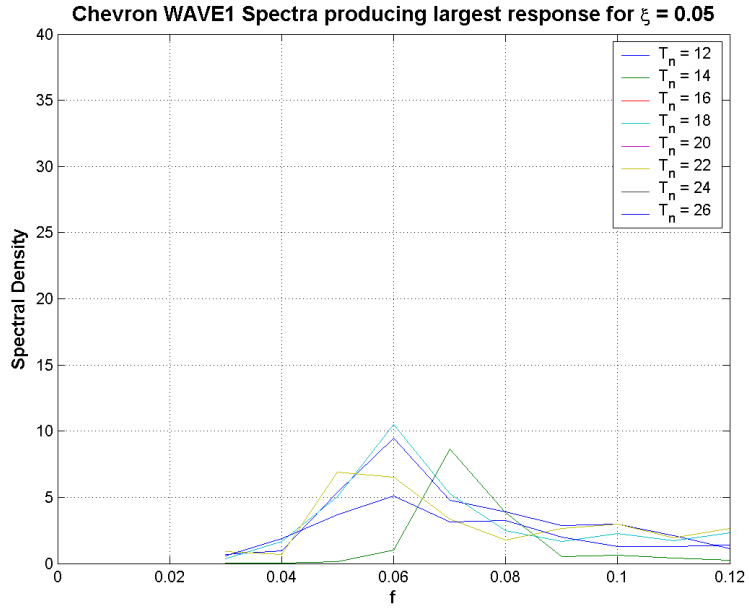

Bonga WaveScan
Spectra producing largest response for T_n = 20
Spectral Density
f
ξ = 0.05
ξ = 0.10
ξ = 0.15
ξ = 0.20
ξ = 0.25
ξ = 0.30

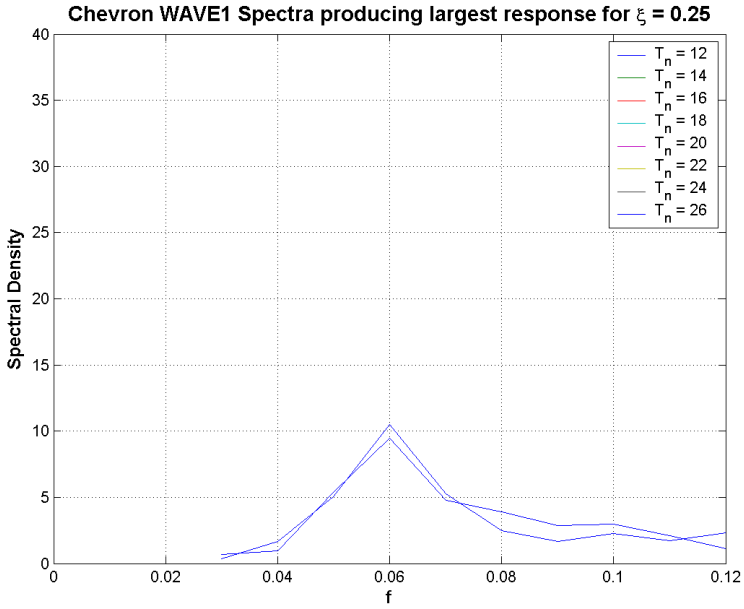

Bonga WaveScan
Spectra producing largest response for ξ = 0.05
Spectral Density
f
T_n = 12
T_n = 14
T_n = 16
T_n = 18
T_n = 20
T_n = 22
T_n = 24
T_n = 26

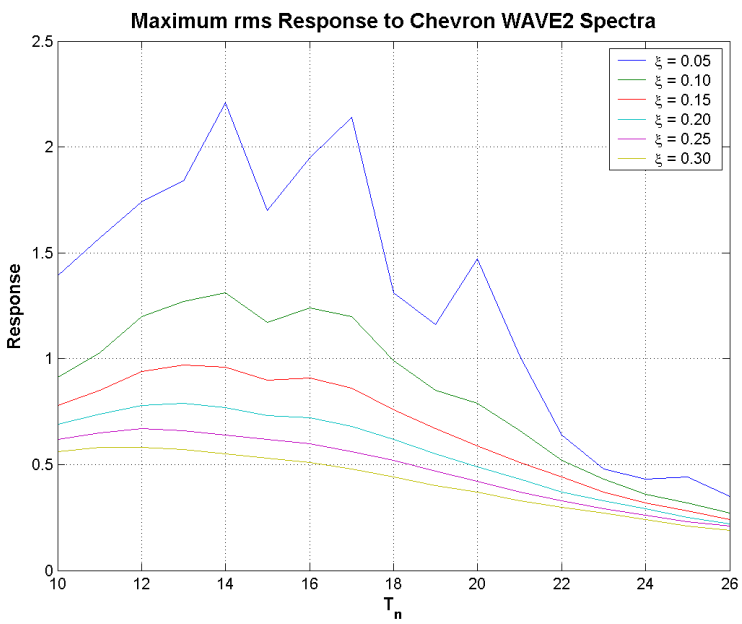

Bonga WaveScan
Spectra producing largest response for ξ = 0.25
Spectral Density
f
T_n = 12
T_n = 14
T_n = 16
T_n = 18
T_n = 20
T_n = 22
T_n = 24
T_n = 26

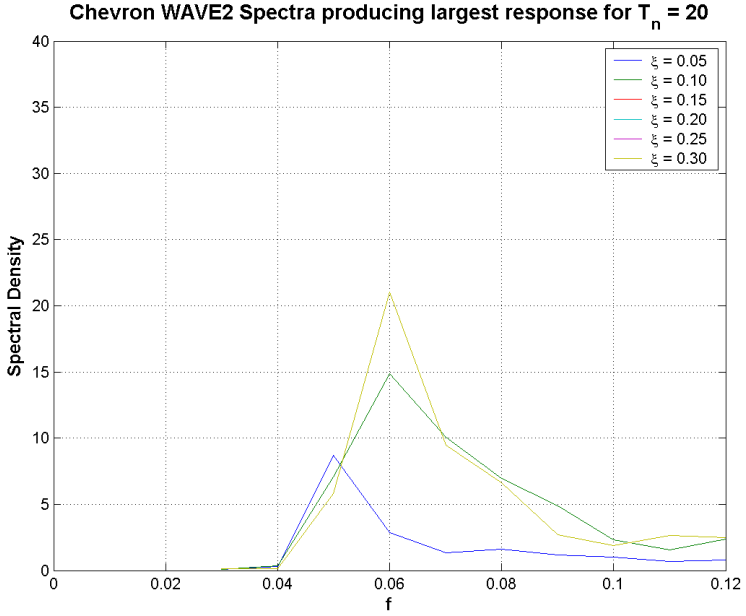

Maximum rms Response to Chevron WAVE1 Spectra
Response
T_n
ξ = 0.05
ξ = 0.10
ξ = 0.15
ξ = 0.20
ξ = 0.25
ξ = 0.30

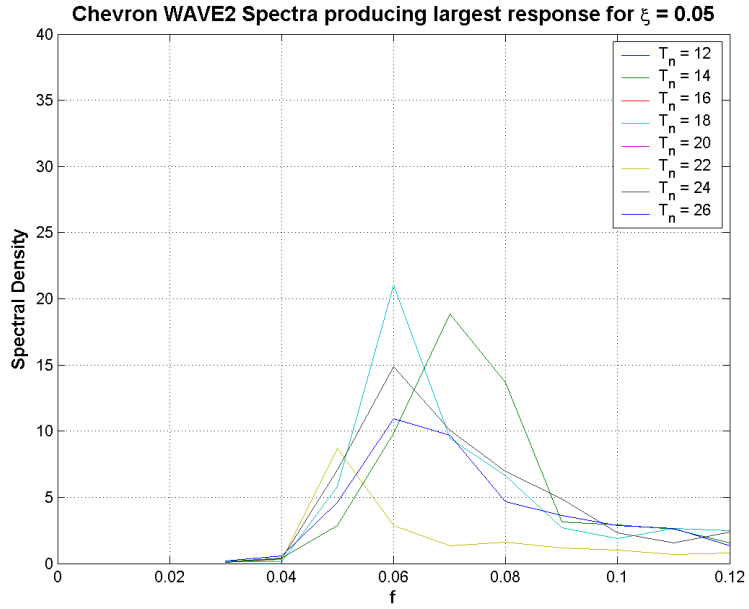

Chevron WAVE1 Spectra producing largest response for T_n = 20
Spectral Density
f
ξ = 0.05
ξ = 0.10
ξ = 0.15
ξ = 0.20
ξ = 0.25
ξ = 0.30

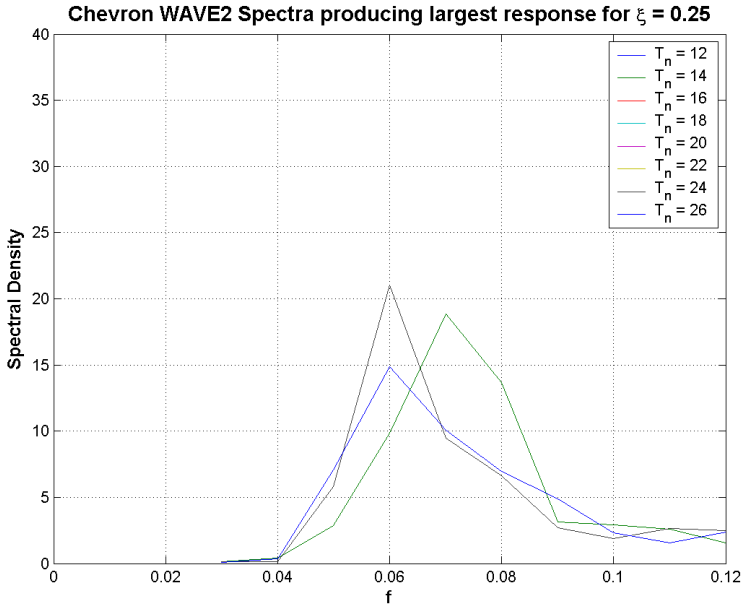

Chevron WAVE1 Spectra producing largest response for ξ = 0.05
Spectral Density
f
T_n = 12
T_n = 14
T_n = 16
T_n = 18
T_n = 20
T_n = 22
T_n = 24
T_n = 26

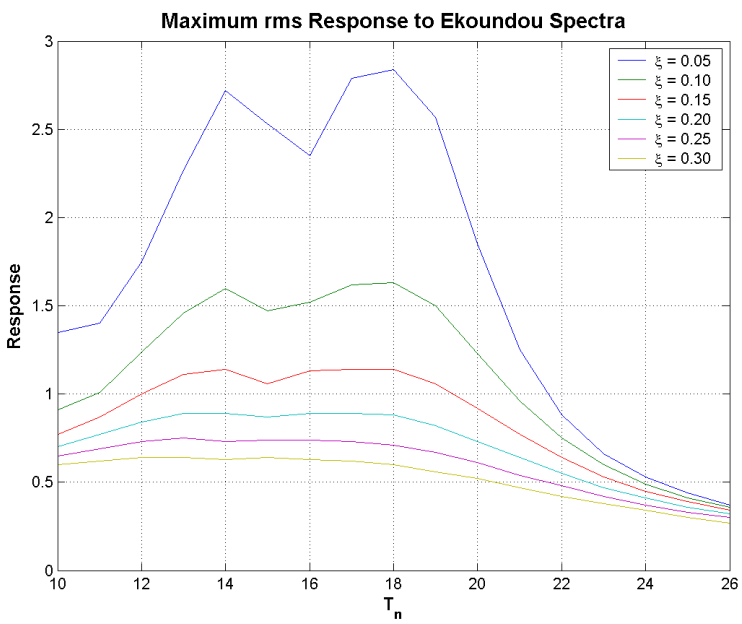

Chevron WAVE1 Spectra producing largest response for ξ = 0.25
Spectral Density
f
T_n = 12
T_n = 14
T_n = 16
T_n = 18
T_n = 20
T_n = 22
T_n = 24
T_n = 26

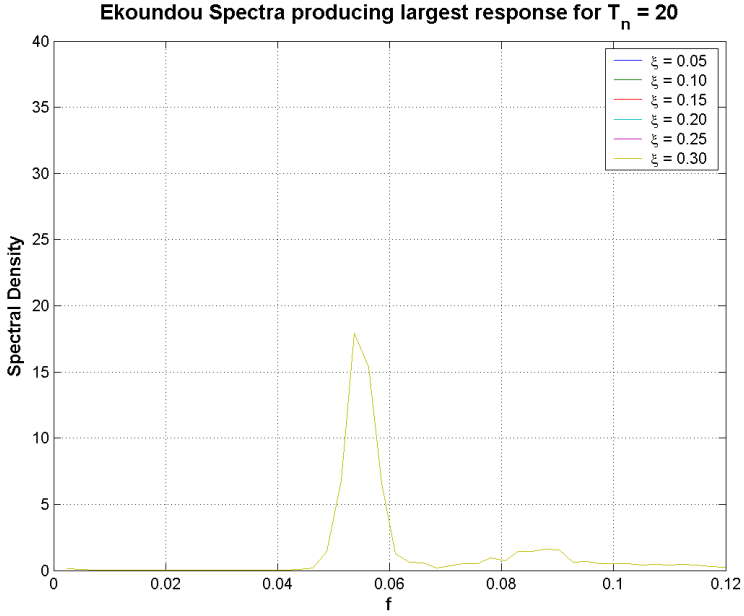

Maximum rms Response to Chevron WAVE2 Spectra
Response
T_n
ξ = 0.05
ξ = 0.10
ξ = 0.15
ξ = 0.20
ξ = 0.25
ξ = 0.30

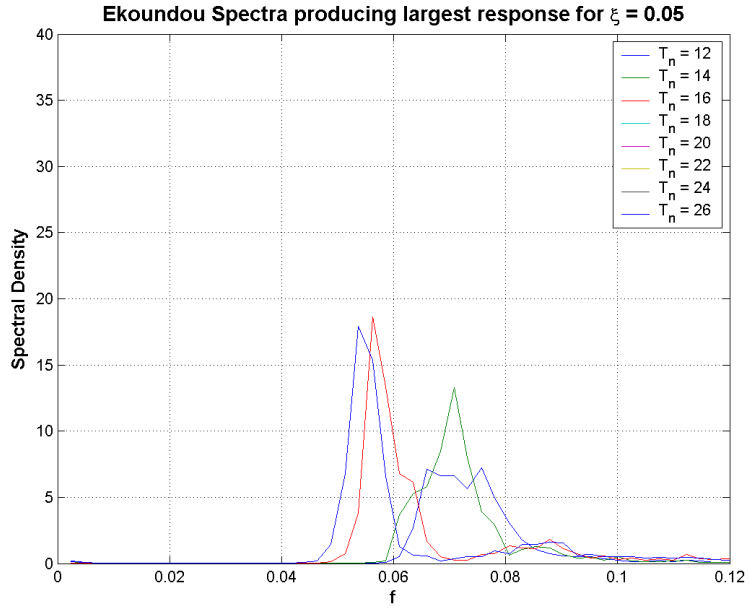

Chevron WAVE2 Spectra producing largest response for T_n = 20
Spectral Density
f
ξ = 0.05
ξ = 0.10
ξ = 0.15
ξ = 0.20
ξ = 0.25
ξ = 0.30

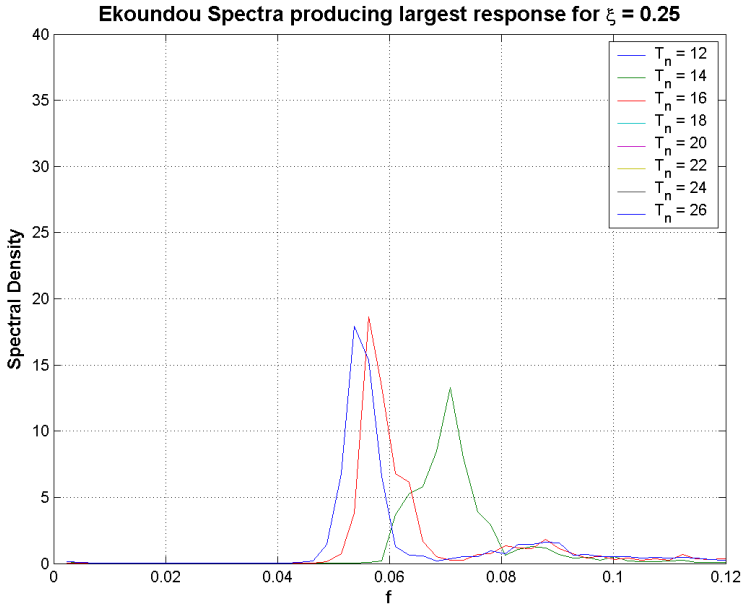

Chevron WAVE2 Spectra producing largest response for ξ = 0.05
Spectral Density
f
T_n = 12
T_n = 14
T_n = 16
T_n = 18
T_n = 20
T_n = 22
T_n = 24
T_n = 26


Chevron WAVE2 Spectra producing largest response for ξ = 0.25
Spectral Density
f
T_n = 12
T_n = 14
T_n = 16
T_n = 18
T_n = 20
T_n = 22
T_n = 24
T_n = 26

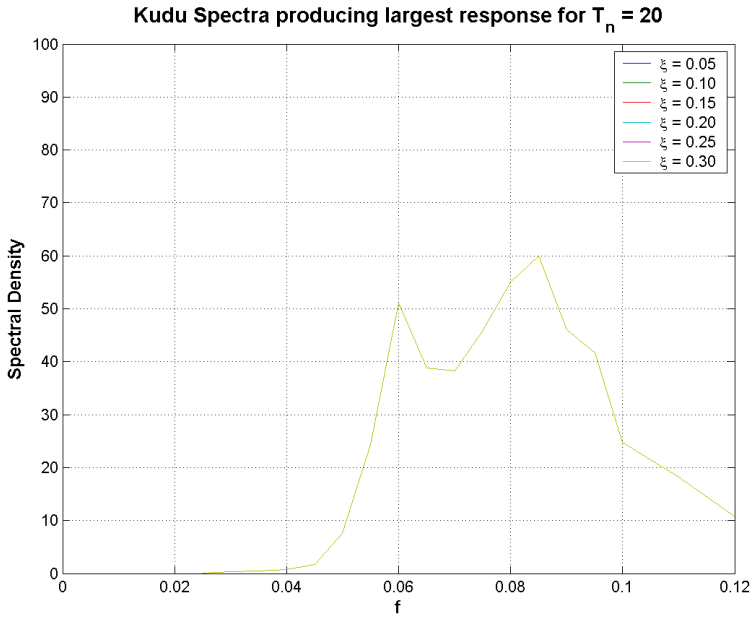

Maximum rms Response to Ekoundou Spectra
Response
T_n
ξ = 0.05
ξ = 0.10
ξ = 0.15
ξ = 0.20
ξ = 0.25
ξ = 0.30

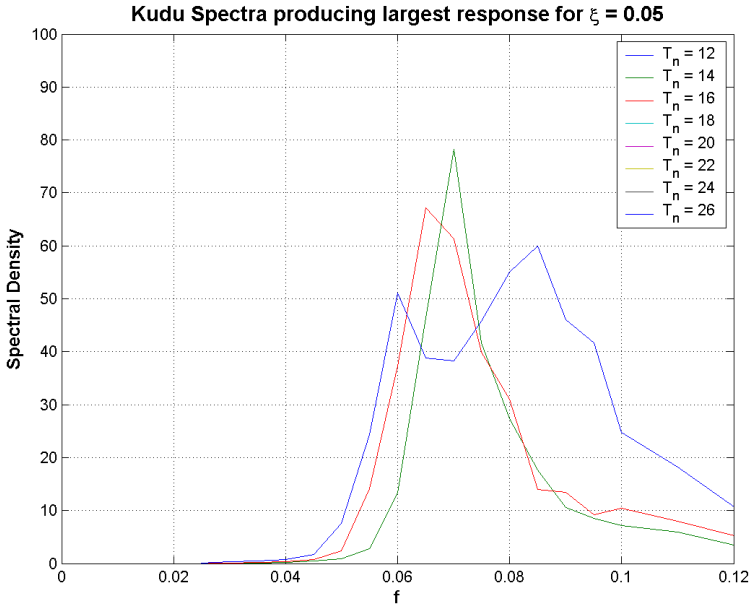

Ekoundou Spectra producing largest response for T_n = 20
Spectral Density
f
ξ = 0.05
ξ = 0.10
ξ = 0.15
ξ = 0.20
ξ = 0.25
ξ = 0.30

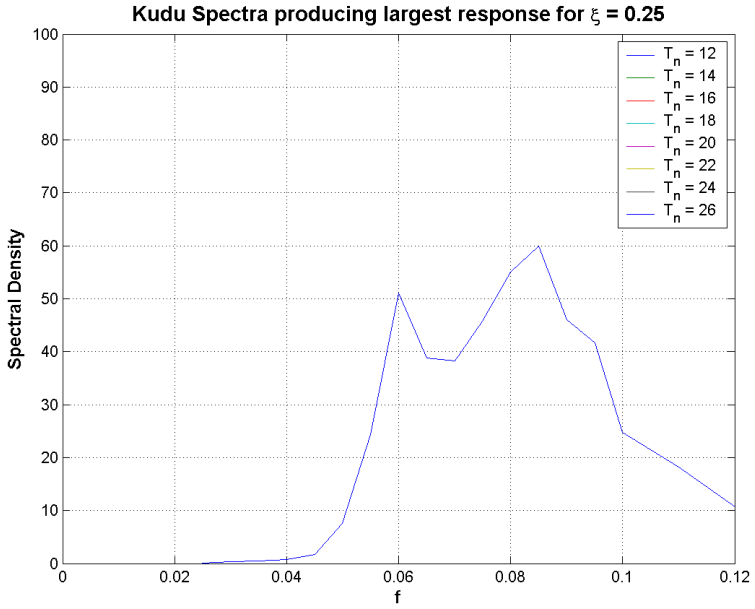

Ekoundou Spectra producing largest response for ξ = 0.05
Spectral Density
f
T_n = 12
T_n = 14
T_n = 16
T_n = 18
T_n = 20
T_n = 22
T_n = 24
T_n = 26


Ekoundou Spectra producing largest response for ξ = 0.25
Spectral Density
f
T_n = 12
T_n = 14
T_n = 16
T_n = 18
T_n = 20
T_n = 22
T_n = 24
T_n = 26


Maximum rms Response to Kudu Spectra
Response
T_n
ξ = 0.05
ξ = 0.10
ξ = 0.15
ξ = 0.20
ξ = 0.25
ξ = 0.30


Kudu Spectra producing largest response for T_n = 20
Spectral Density
f
ξ = 0.05
ξ = 0.10
ξ = 0.15
ξ = 0.20
ξ = 0.25
ξ = 0.30

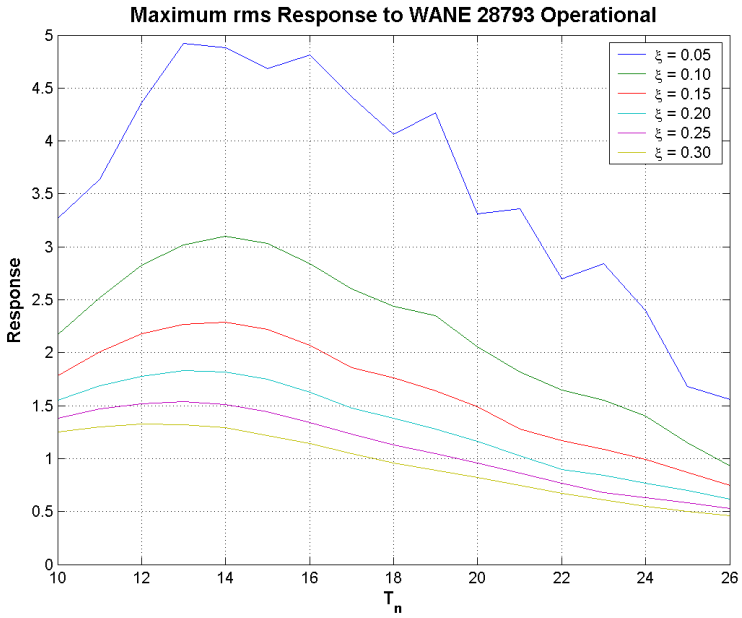

Kudu Spectra producing largest response for ξ = 0.05
Spectral Density
f
T_n = 12
T_n = 14
T_n = 16
T_n = 18
T_n = 20
T_n = 22
T_n = 24
T_n = 26

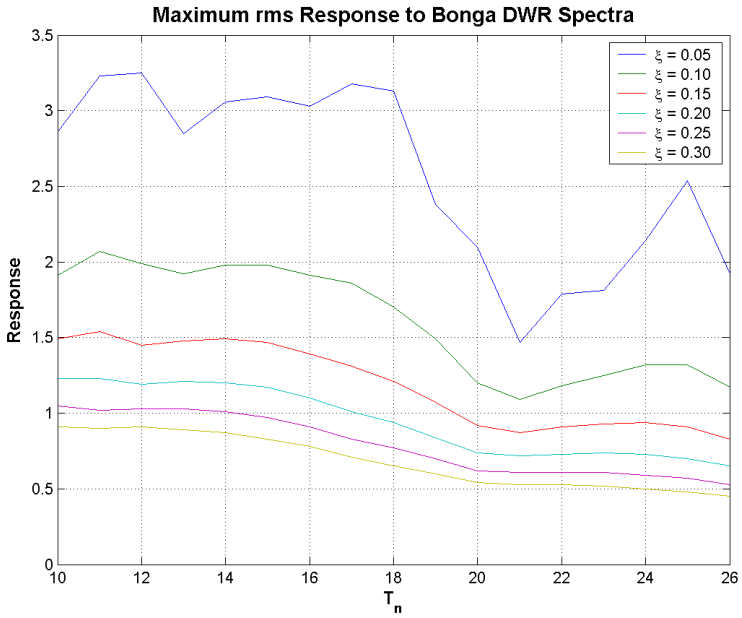

Kudu Spectra producing largest response for ξ = 0.25
Spectral Density
f
T_n = 12
T_n = 14
T_n = 16
T_n = 18
T_n = 20
T_n = 22
T_n = 24
T_n = 26

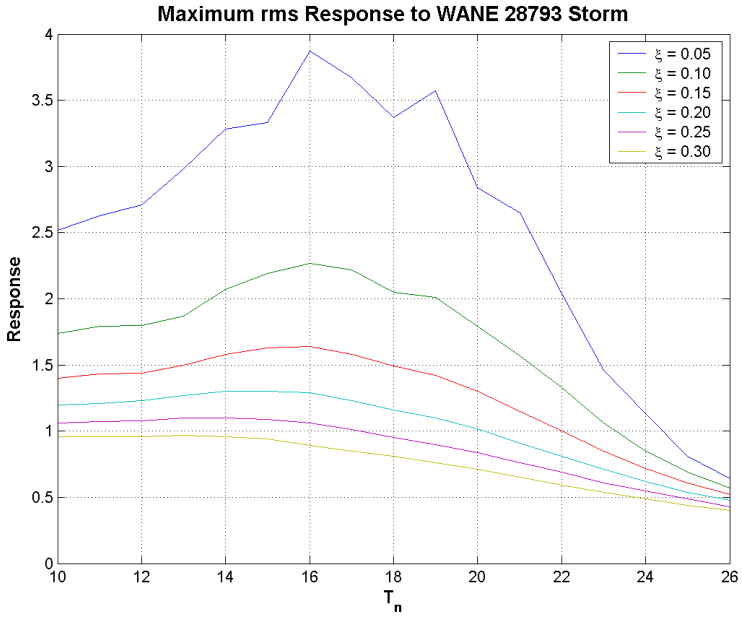
Appendix 7.5

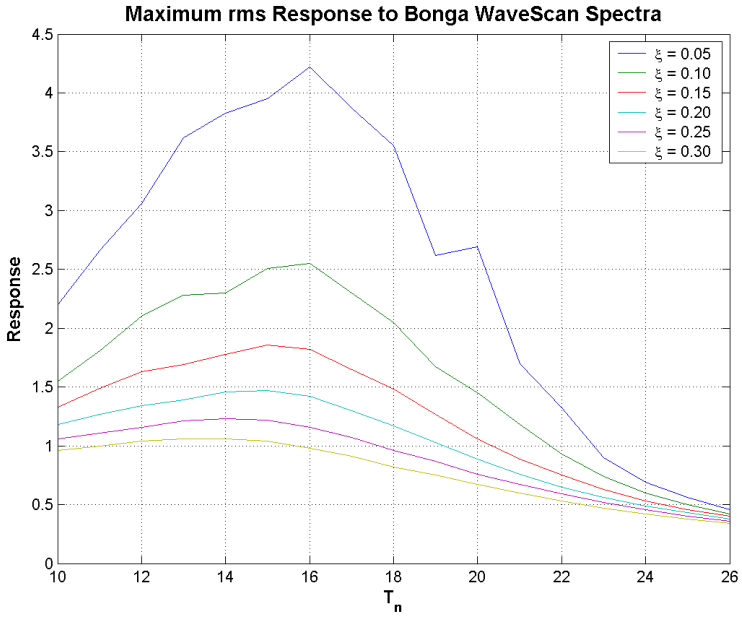
Maximum rms Responses and Associated Spectra

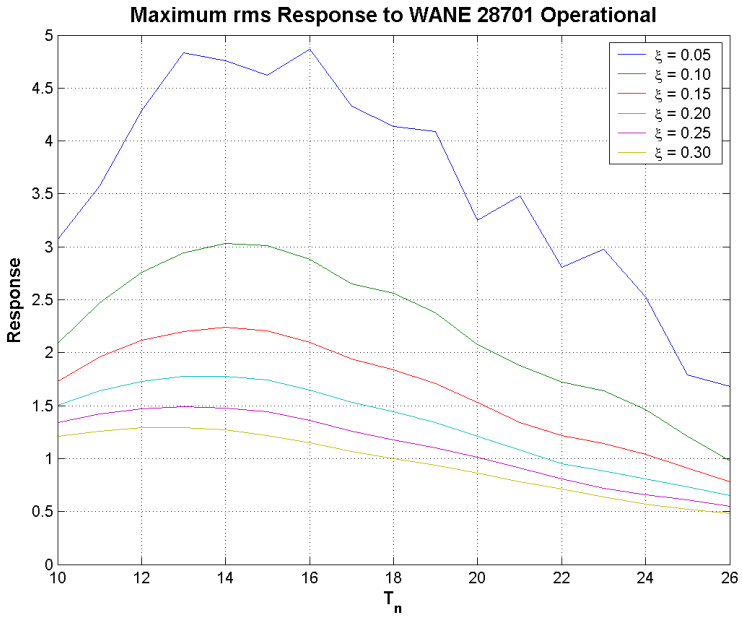
Comparisons of WANE and Measured Data

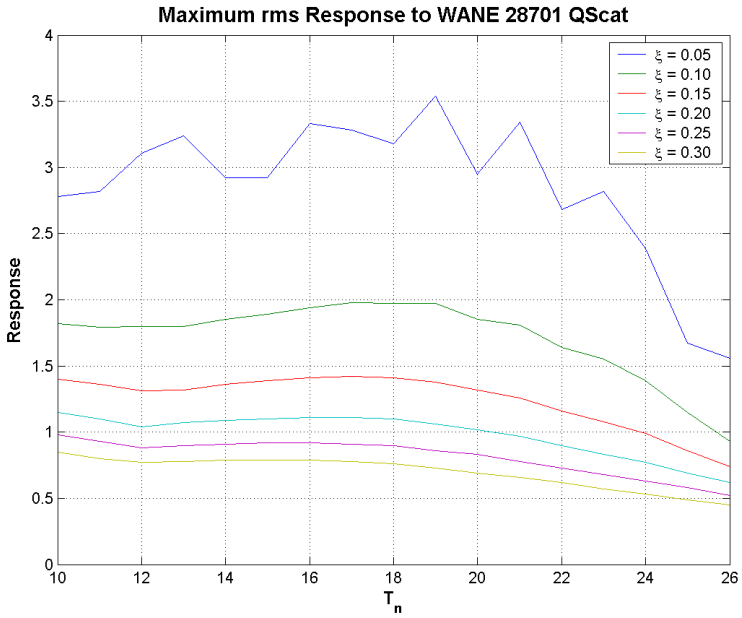

Maximum rms Response to WANE 28793 Operational
Response
T_n
ξ = 0.05
ξ = 0.10
ξ = 0.15
ξ = 0.20
ξ = 0.25
ξ = 0.30

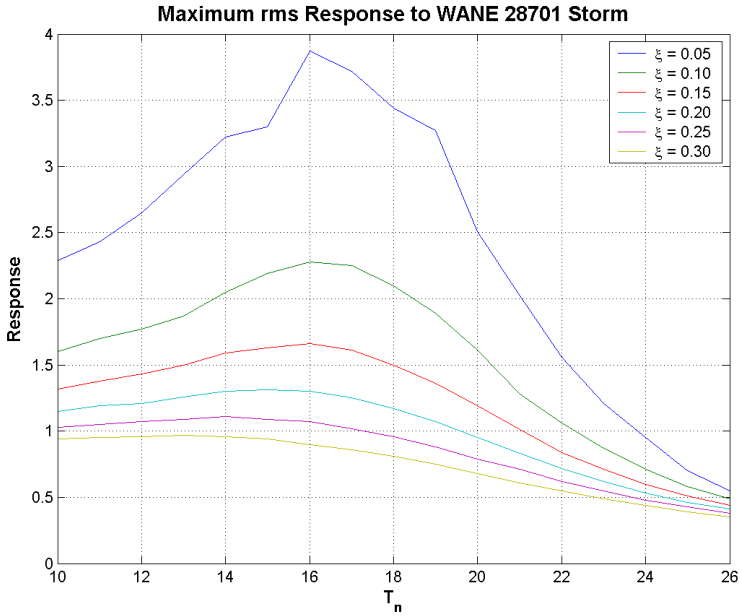

Maximum rms Response to Bonga DWR Spectra
Response
T_n
ξ = 0.05
ξ = 0.10
ξ = 0.15
ξ = 0.20
ξ = 0.25
ξ = 0.30

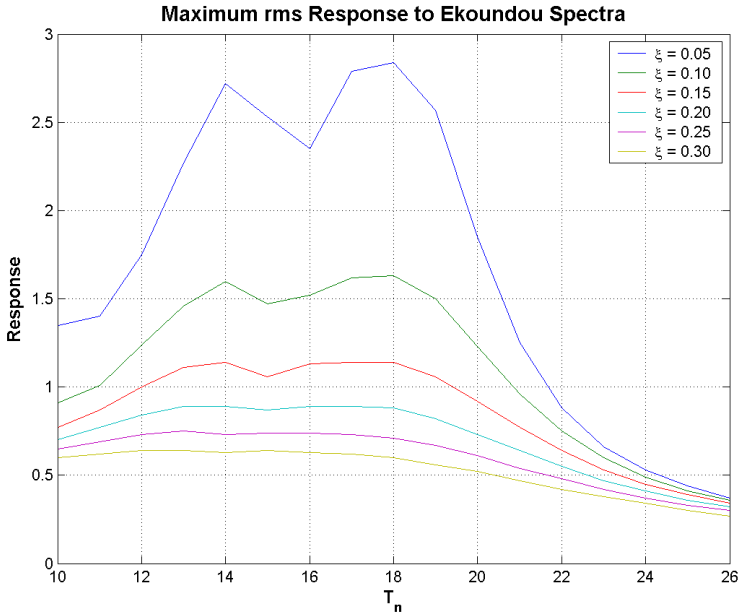

Maximum rms Response to WANE 28793 Storm
Response
T_n
ξ = 0.05
ξ = 0.10
ξ = 0.15
ξ = 0.20
ξ = 0.25
ξ = 0.30

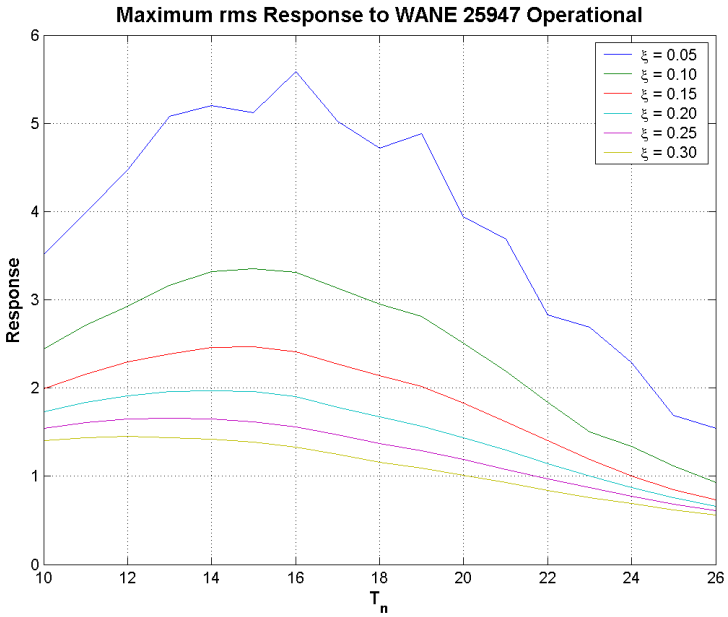

Maximum rms Response to Bonga WaveScan Spectra
Response
T_n
ξ = 0.05
ξ = 0.10
ξ = 0.15
ξ = 0.20
ξ = 0.25
ξ = 0.30

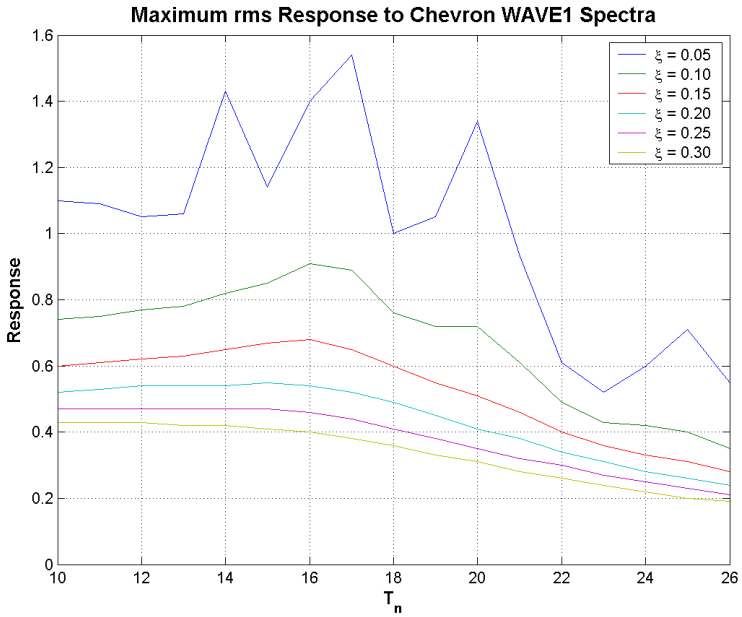

Maximum rms Response to WANE 28701 Operational
Response
T_n
ξ = 0.05
ξ = 0.10
ξ = 0.15
ξ = 0.20
ξ = 0.25
ξ = 0.30

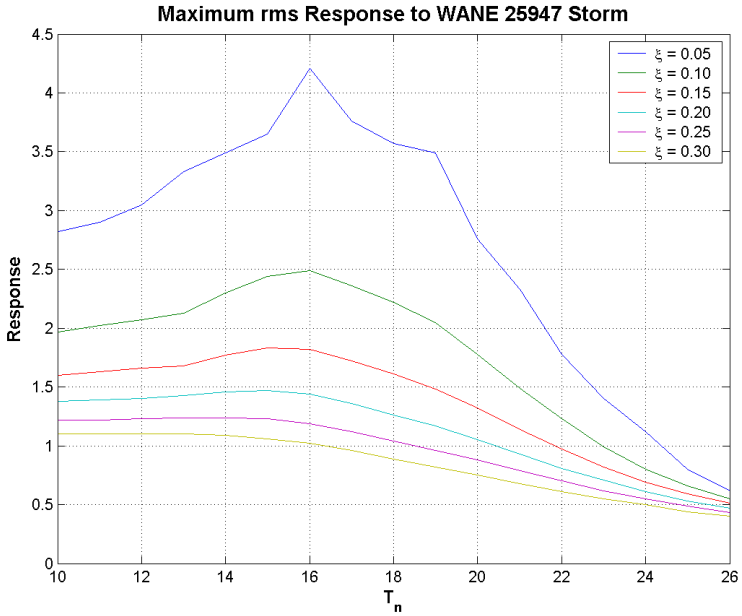

Maximum rms Response to WANE 28701 QScat
Response
T_n
ξ = 0.05
ξ = 0.10
ξ = 0.15
ξ = 0.20
ξ = 0.25
ξ = 0.30

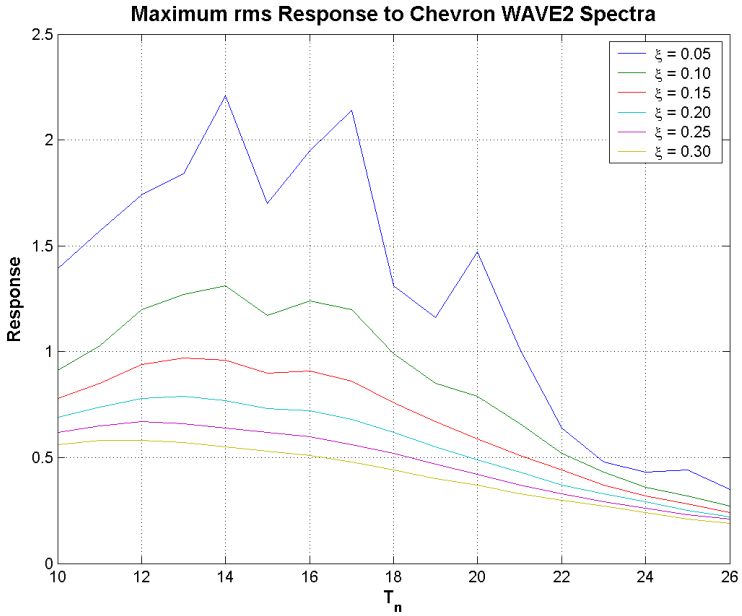

Maximum rms Response to WANE 28701 Storm
Response
T_n
ξ = 0.05
ξ = 0.10
ξ = 0.15
ξ = 0.20
ξ = 0.25
ξ = 0.30

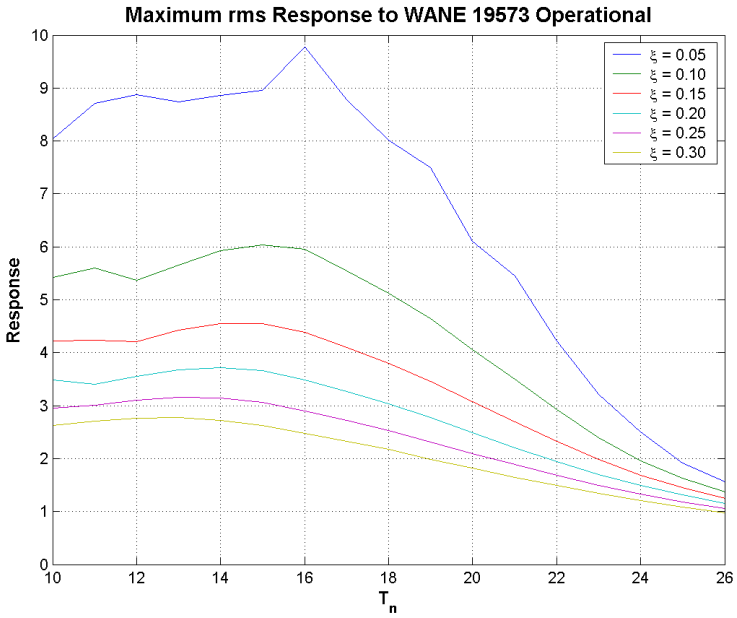

Maximum rms Response to Ekoundou Spectra
Response
T_n
ξ = 0.05
ξ = 0.10
ξ = 0.15
ξ = 0.20
ξ = 0.25
ξ = 0.30

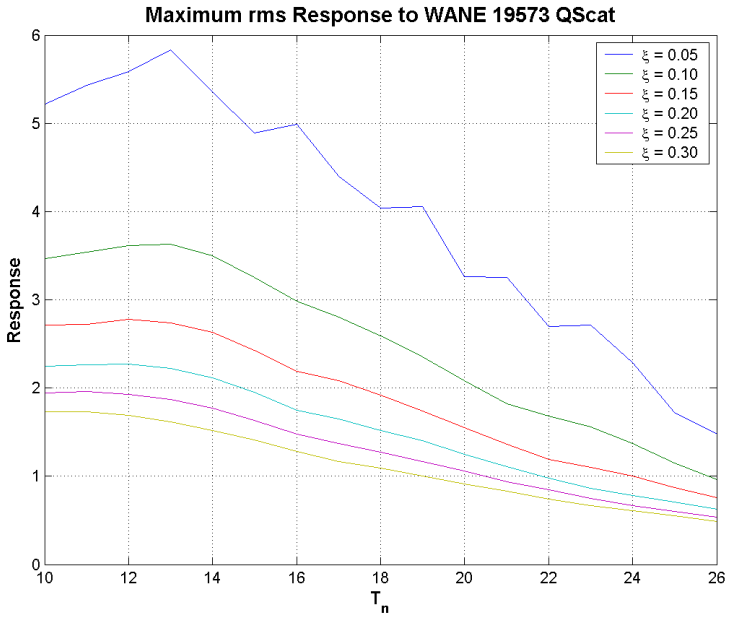

Maximum rms Response to WANE 25947 Operational
Response
T_n
ξ = 0.05
ξ = 0.10
ξ = 0.15
ξ = 0.20
ξ = 0.25
ξ = 0.30

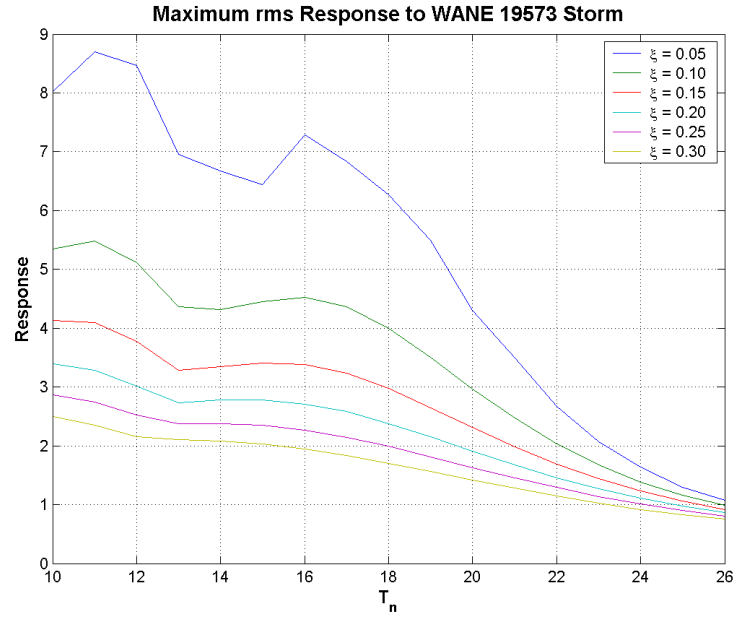

Maximum rms Response to Chevron WAVE1 Spectra
Response
T_n
ξ = 0.05
ξ = 0.10
ξ = 0.15
ξ = 0.20
ξ = 0.25
ξ = 0.30

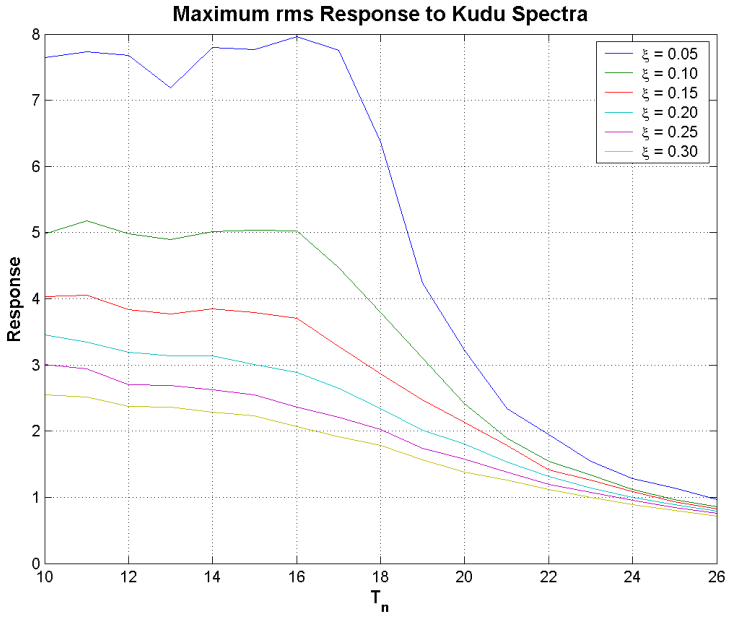

Maximum rms Response to WANE 25947 Storm
Response
T_n
ξ = 0.05
ξ = 0.10
ξ = 0.15
ξ = 0.20
ξ = 0.25
ξ = 0.30

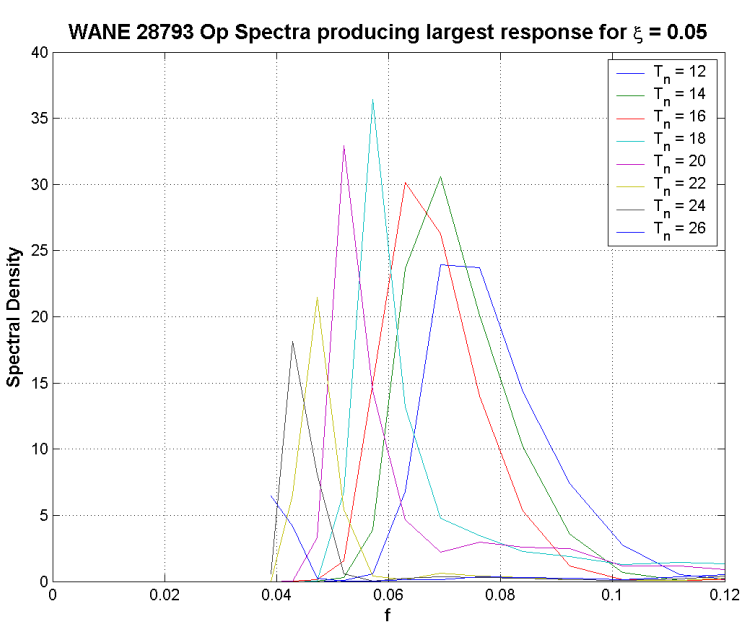

Maximum rms Response to Chevron WAVE2 Spectra
Response
T_n
ξ = 0.05
ξ = 0.10
ξ = 0.15
ξ = 0.20
ξ = 0.25
ξ = 0.30

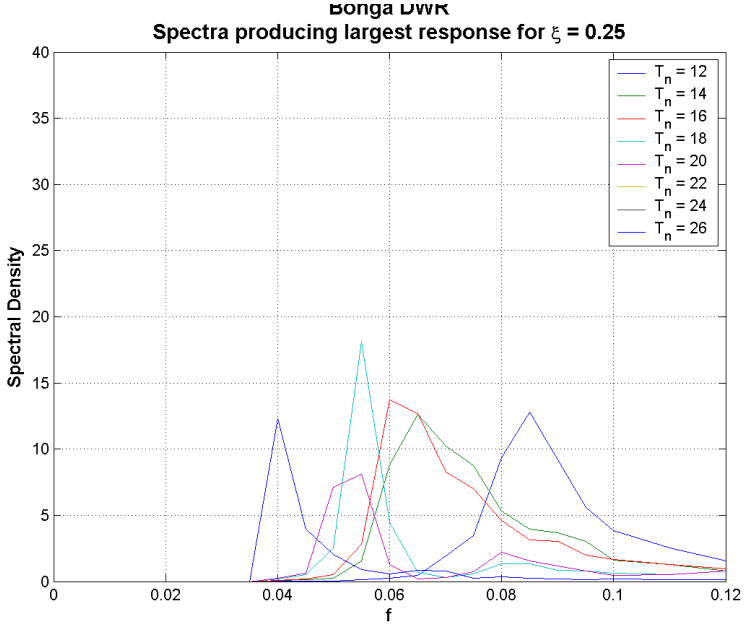

Maximum rms Response to WANE 19573 Operational
Response
T_n
ξ = 0.05
ξ = 0.10
ξ = 0.15
ξ = 0.20
ξ = 0.25
ξ = 0.30

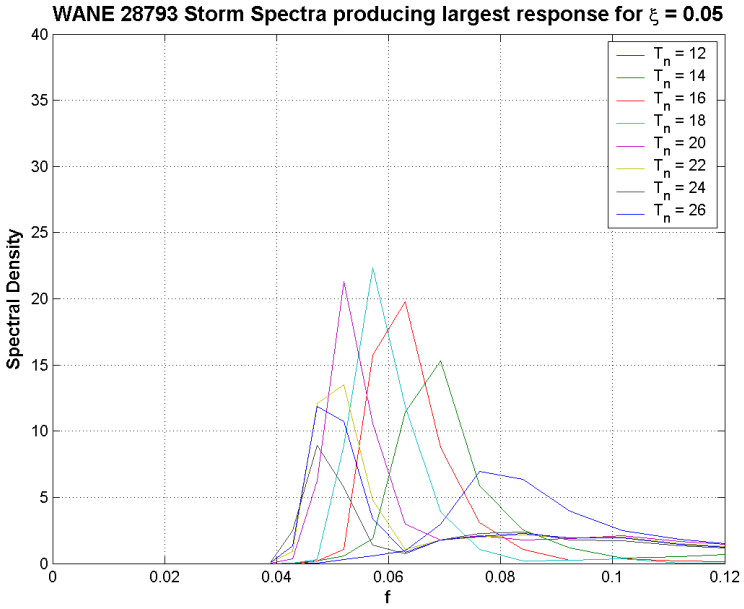

Maximum rms Response to WANE 19573 QScat
Response
T_n
ξ = 0.05
ξ = 0.10
ξ = 0.15
ξ = 0.20
ξ = 0.25
ξ = 0.30

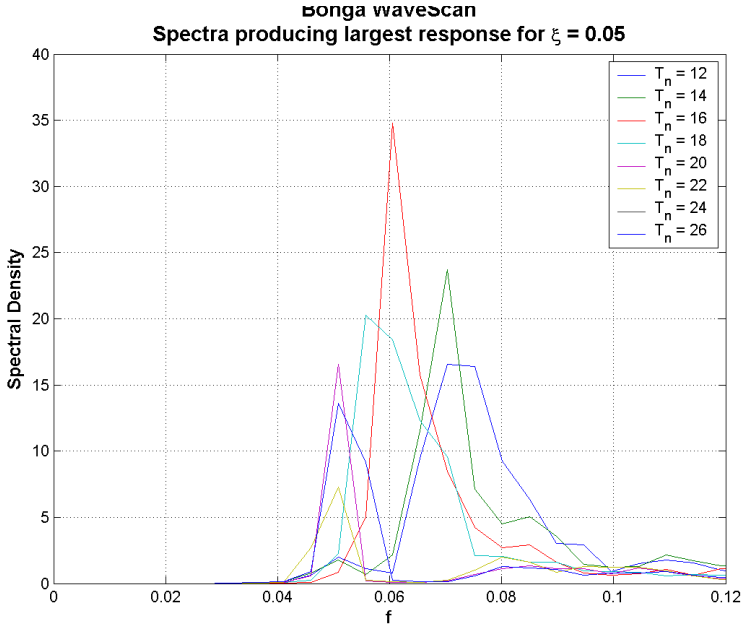

Maximum rms Response to WANE 19573 Storm
Response
T_n
ξ = 0.05
ξ = 0.10
ξ = 0.15
ξ = 0.20
ξ = 0.25
ξ = 0.30

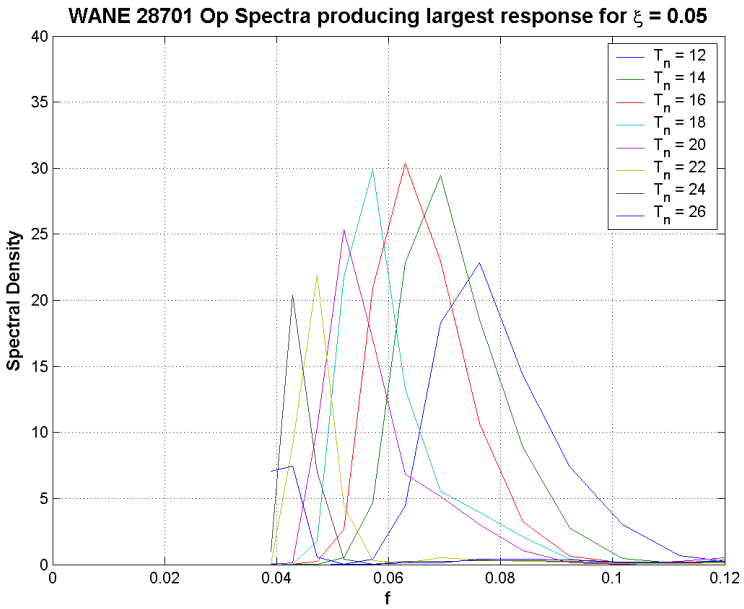

Maximum rms Response to Kudu Spectra
Response
T_n
ξ = 0.05
ξ = 0.10
ξ = 0.15
ξ = 0.20
ξ = 0.25
ξ = 0.30

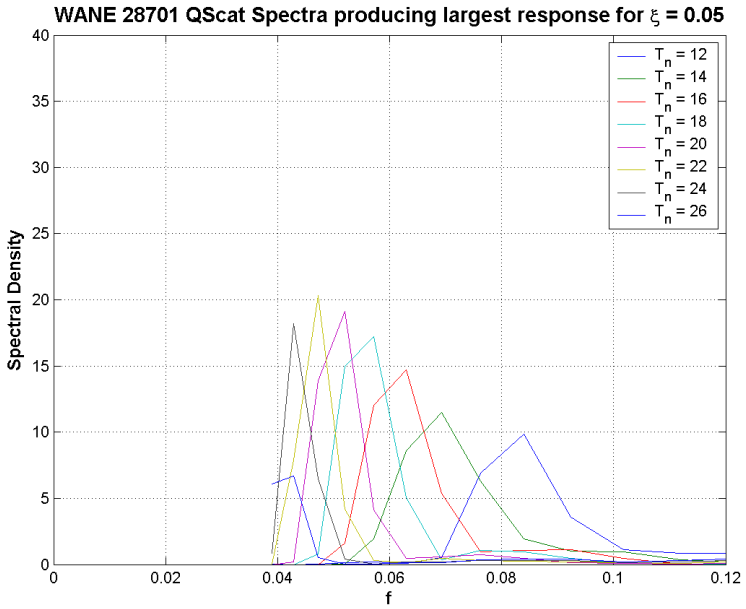

WANE 28793 Op Spectra producing largest response for ξ = 0.05
Spectral Density
f
T_n = 12
T_n = 14
T_n = 16
T_n = 18
T_n = 20
T_n = 22
T_n = 24
T_n = 26

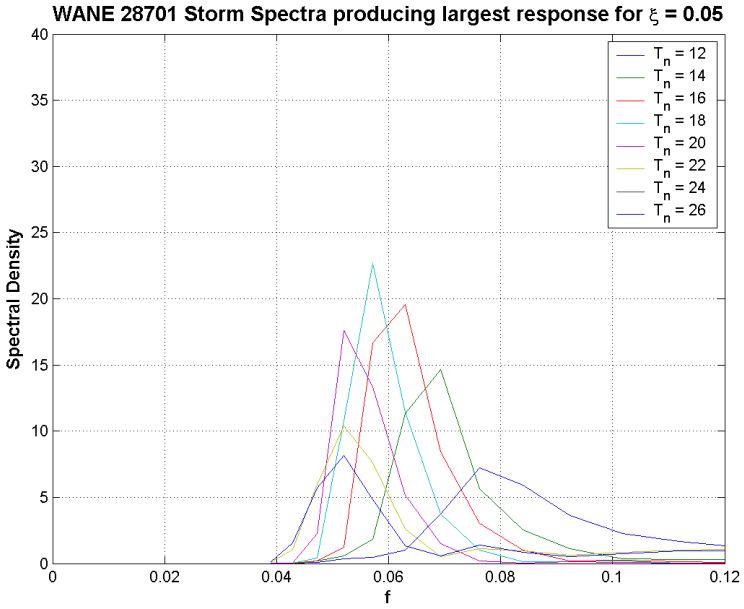

Bonga DWR
Spectra producing largest response for ξ = 0.25
Spectral Density
f
T_n = 12
T_n = 14
T_n = 16
T_n = 18
T_n = 20
T_n = 22
T_n = 24
T_n = 26

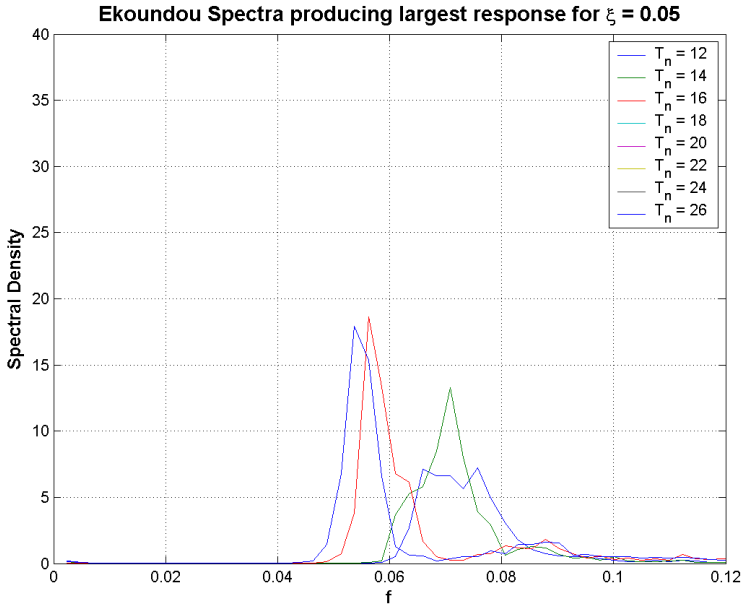

WANE 28793 Storm Spectra producing largest response for ξ = 0.05
Spectral Density
f
T_n = 12
T_n = 14
T_n = 16
T_n = 18
T_n = 20
T_n = 22
T_n = 24
T_n = 26

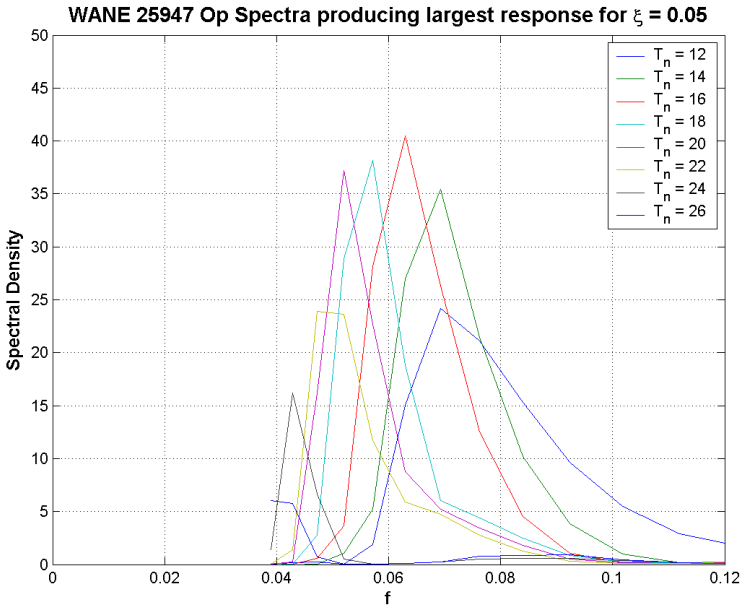

Bonga WaveScan
Spectra producing largest response for ξ = 0.05
Spectral Density
f
T_n = 12
T_n = 14
T_n = 16
T_n = 18
T_n = 20
T_n = 22
T_n = 24
T_n = 26

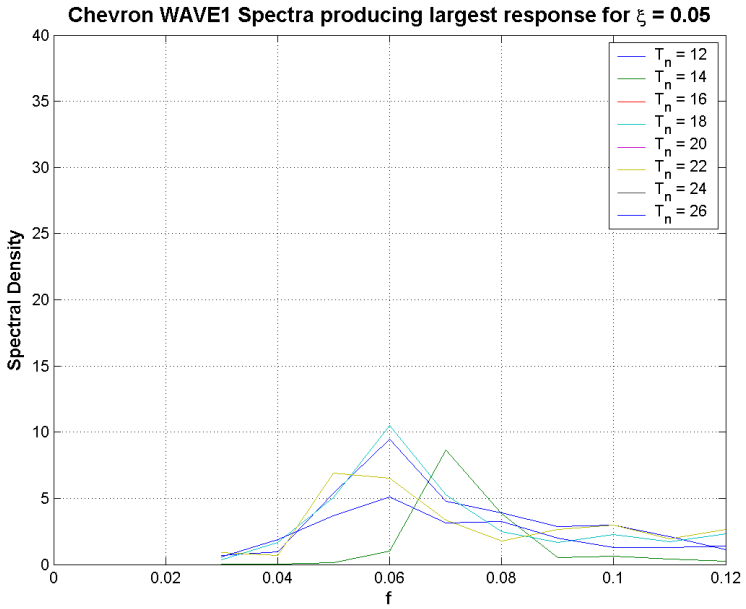

WANE 28701 Op Spectra producing largest response for ξ = 0.05
Spectral Density
f
T_n = 12
T_n = 14
T_n = 16
T_n = 18
T_n = 20
T_n = 22
T_n = 24
T_n = 26

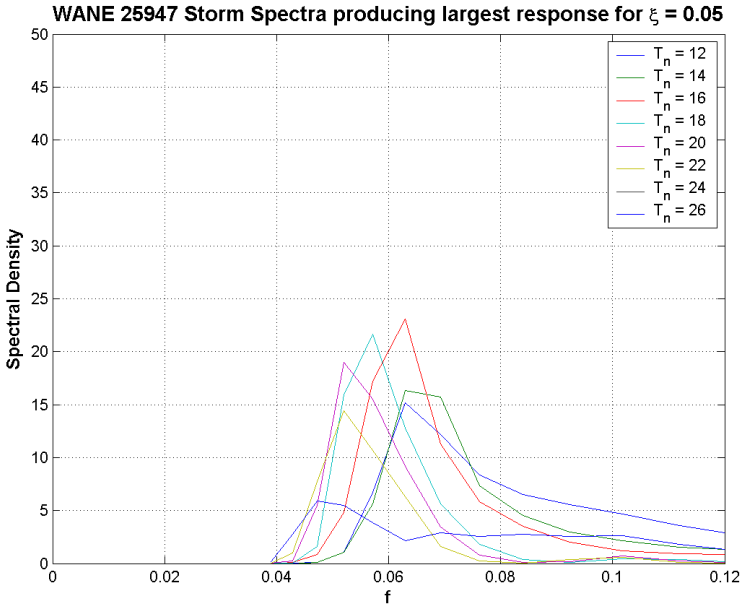

WANE 28701 QScat Spectra producing largest response for ξ = 0.05
Spectral Density
f
T_n = 12
T_n = 14
T_n = 16
T_n = 18
T_n = 20
T_n = 22
T_n = 24
T_n = 26

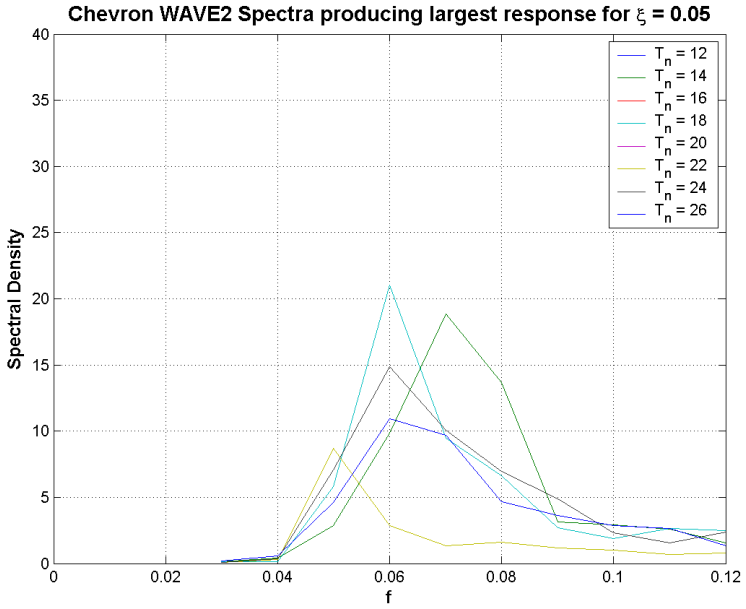

WANE 28701 Storm Spectra producing largest response for ξ = 0.05
Spectral Density
f
T_n = 12
T_n = 14
T_n = 16
T_n = 18
T_n = 20
T_n = 22
T_n = 24
T_n = 26

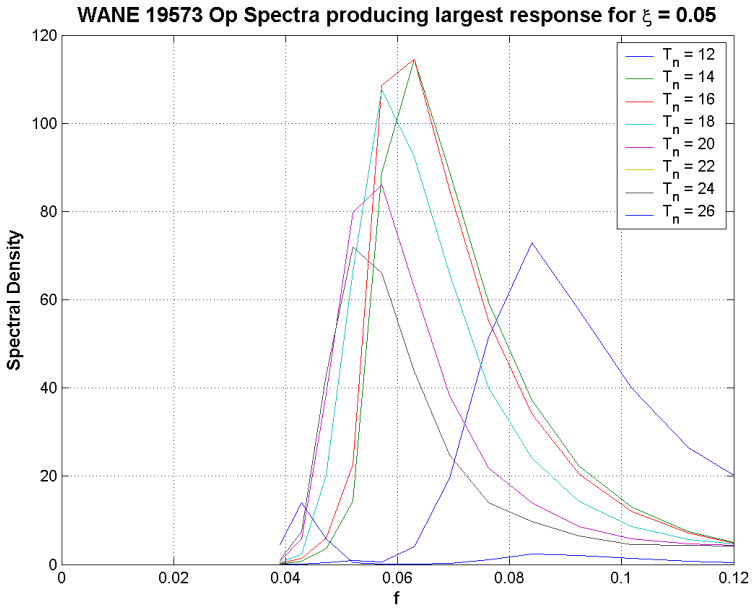

Ekoundou Spectra producing largest response for ξ = 0.05
Spectral Density
f
T_n = 12
T_n = 14
T_n = 16
T_n = 18
T_n = 20
T_n = 22
T_n = 24
T_n = 26

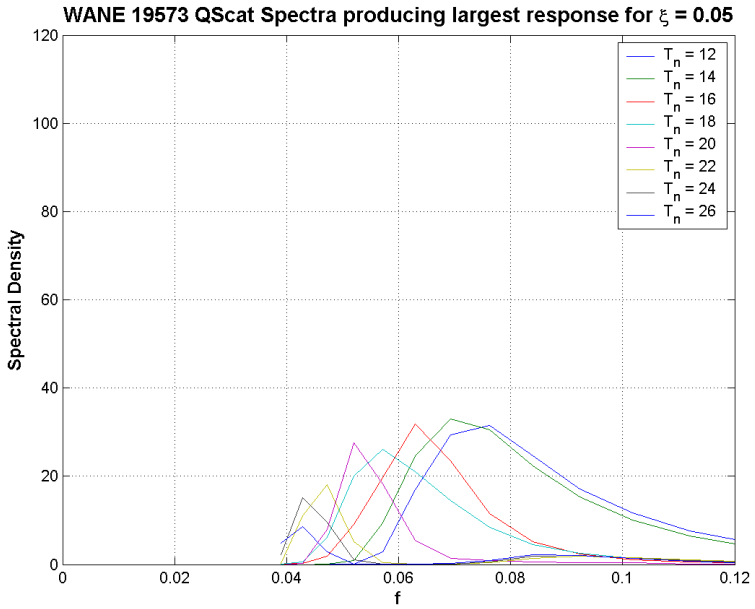

WANE 25947 Op Spectra producing largest response for ξ = 0.05
Spectral Density
f
T_n = 12
T_n = 14
T_n = 16
T_n = 18
T_n = 20
T_n = 22
T_n = 24
T_n = 26

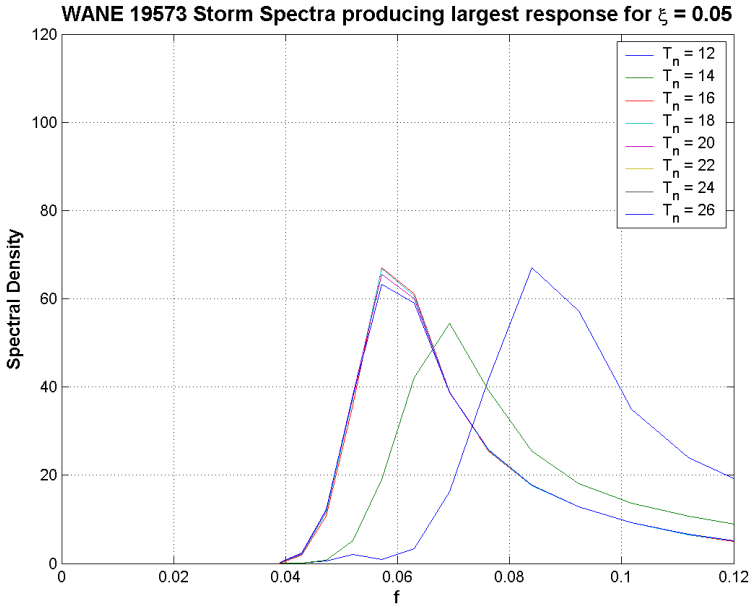

Chevron WAVE1 Spectra producing largest response for ξ = 0.05
Spectral Density
f
T_n = 12
T_n = 14
T_n = 16
T_n = 18
T_n = 20
T_n = 22
T_n = 24
T_n = 26

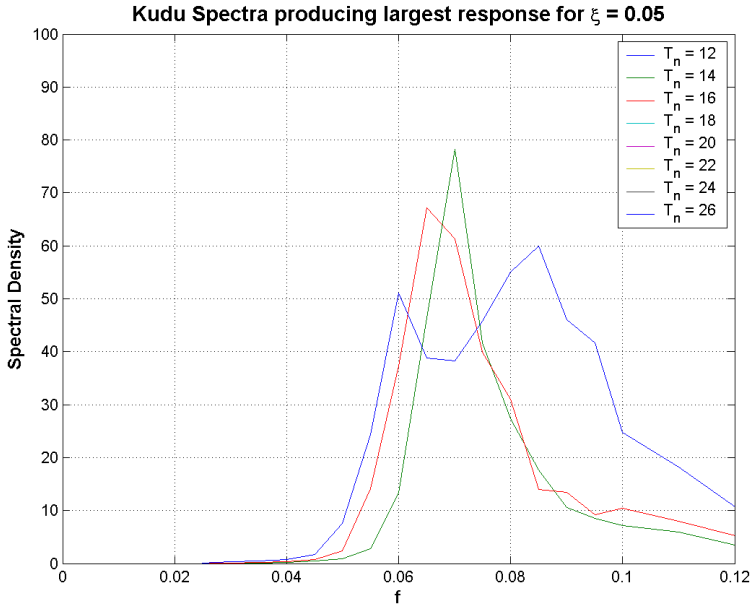

WANE 25947 Storm Spectra producing largest response for ξ = 0.05
Spectral Density
f
T_n = 12
T_n = 14
T_n = 16
T_n = 18
T_n = 20
T_n = 22
T_n = 24
T_n = 26


Chevron WAVE2 Spectra producing largest response for ξ = 0.05
Spectral Density
f
T_n = 12
T_n = 14
T_n = 16
T_n = 18
T_n = 20
T_n = 22
T_n = 24
T_n = 26


WANE 19573 Op Spectra producing largest response for ξ = 0.05
Spectral Density
f
T_n = 12
T_n = 14
T_n = 16
T_n = 18
T_n = 20
T_n = 22
T_n = 24
T_n = 26


WANE 19573 QScat Spectra producing largest response for ξ = 0.05
Spectral Density
f
T_n = 12
T_n = 14
T_n = 16
T_n = 18
T_n = 20
T_n = 22
T_n = 24
T_n = 26

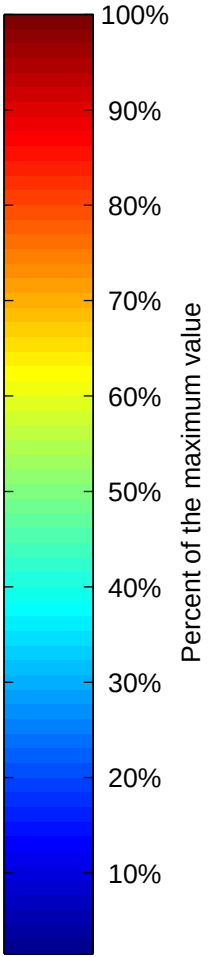

WANE 19573 Storm Spectra producing largest response for ξ = 0.05
Spectral Density
f
T_n = 12
T_n = 14
T_n = 16
T_n = 18
T_n = 20
T_n = 22
T_n = 24
T_n = 26

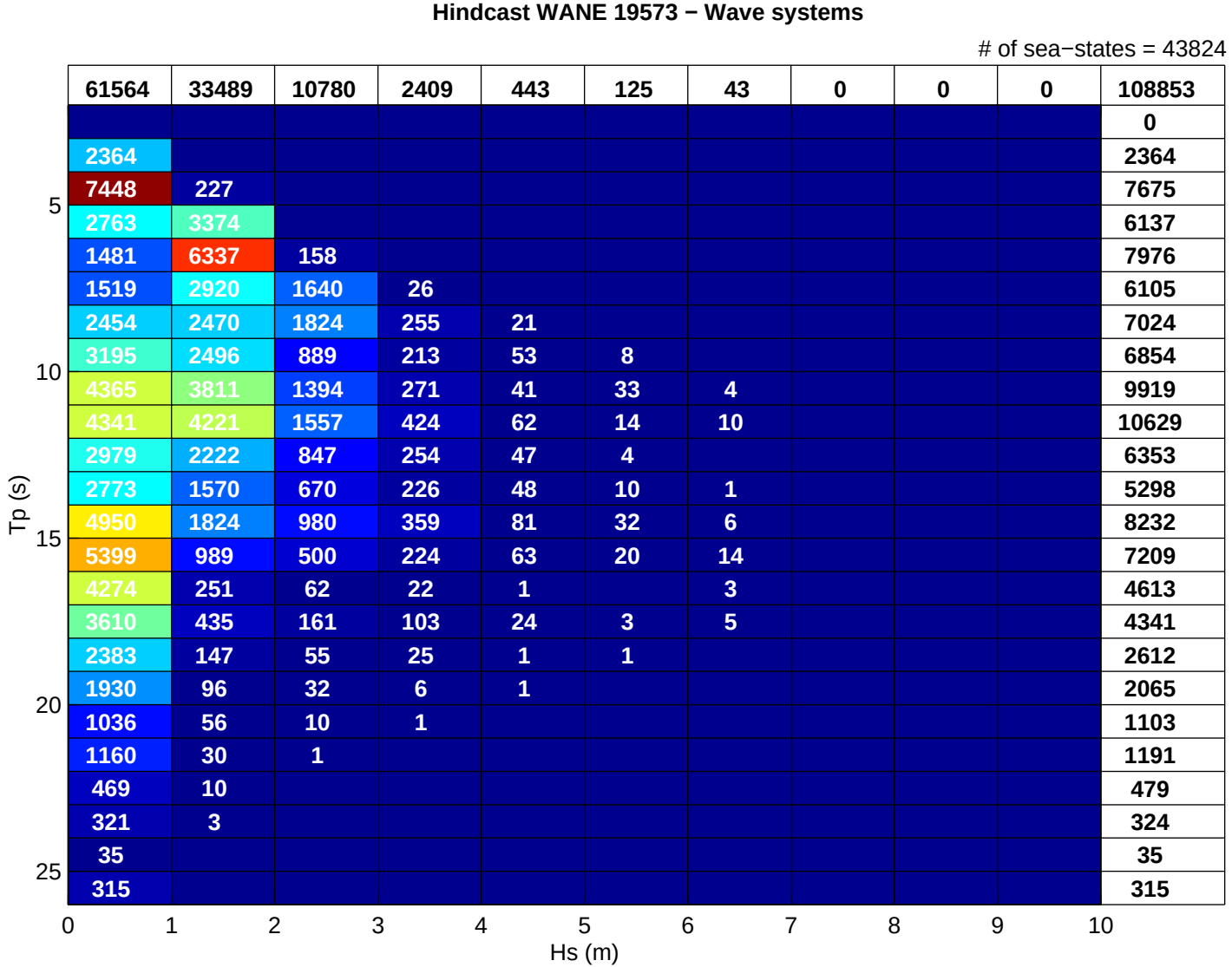

Kudu Spectra producing largest response for ξ = 0.05
Spectral Density
f
T_n = 12
T_n = 14
T_n = 16
T_n = 18
T_n = 20
T_n = 22
T_n = 24
T_n = 26

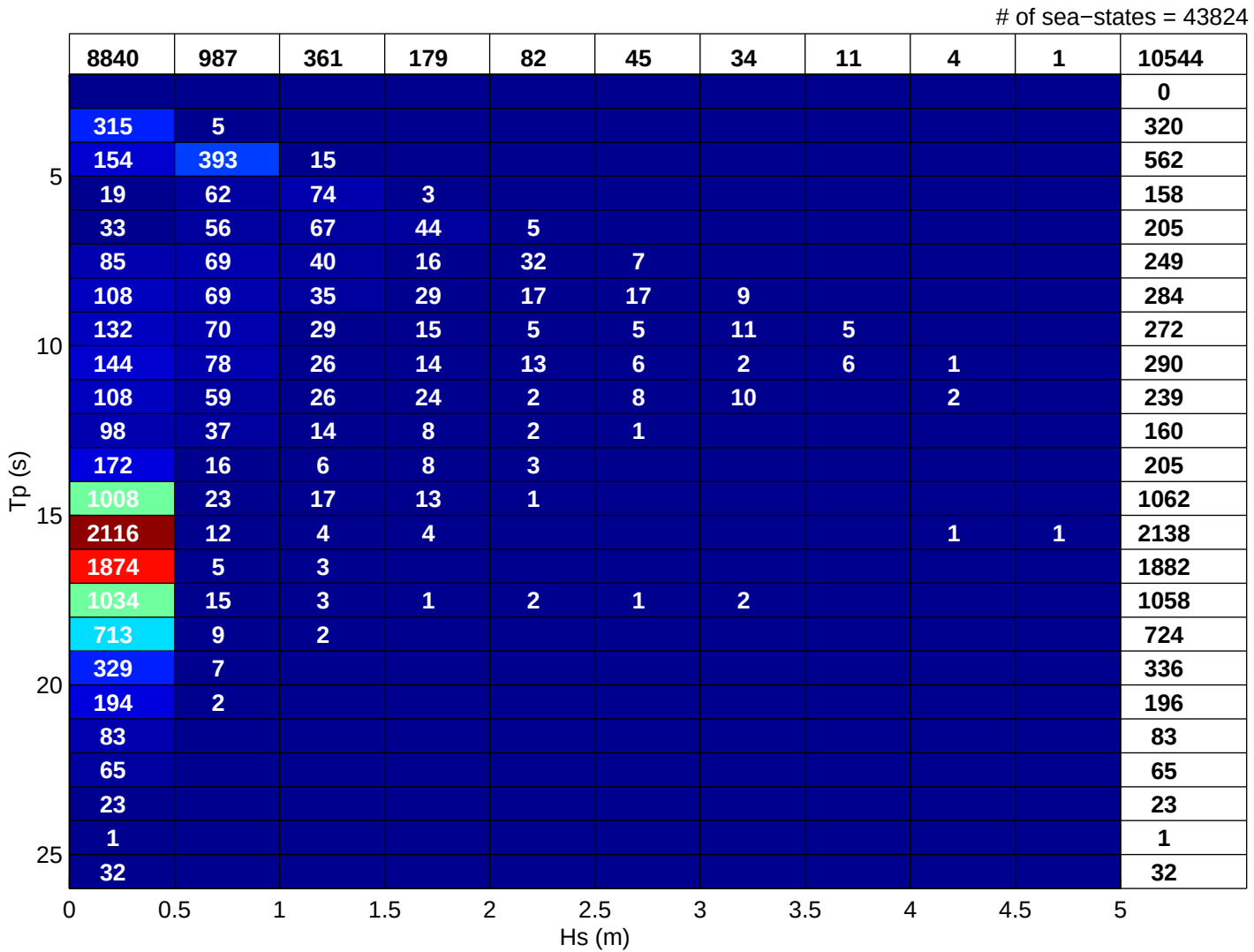
Appendix 8.1

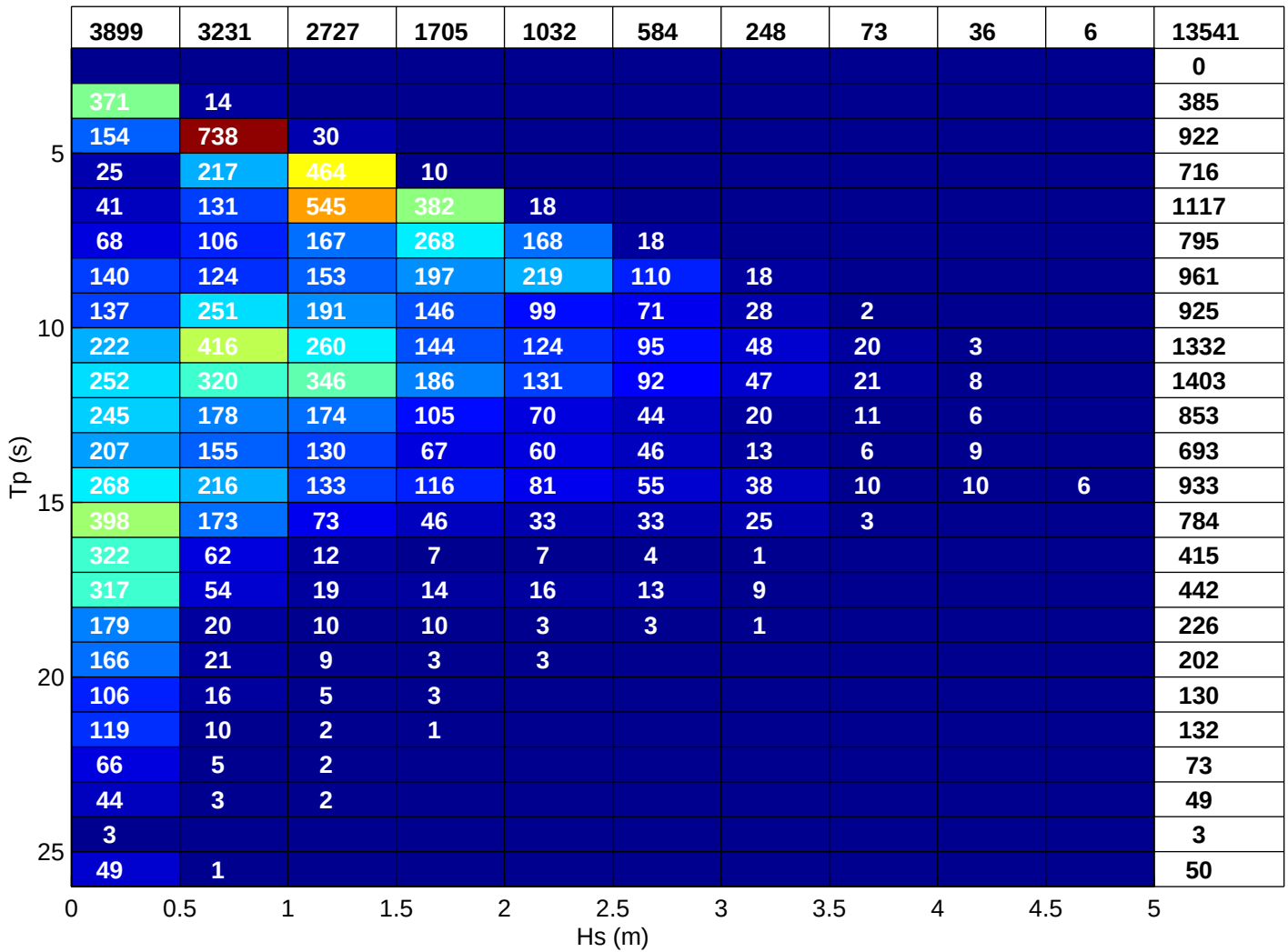
Scatter Diagrams

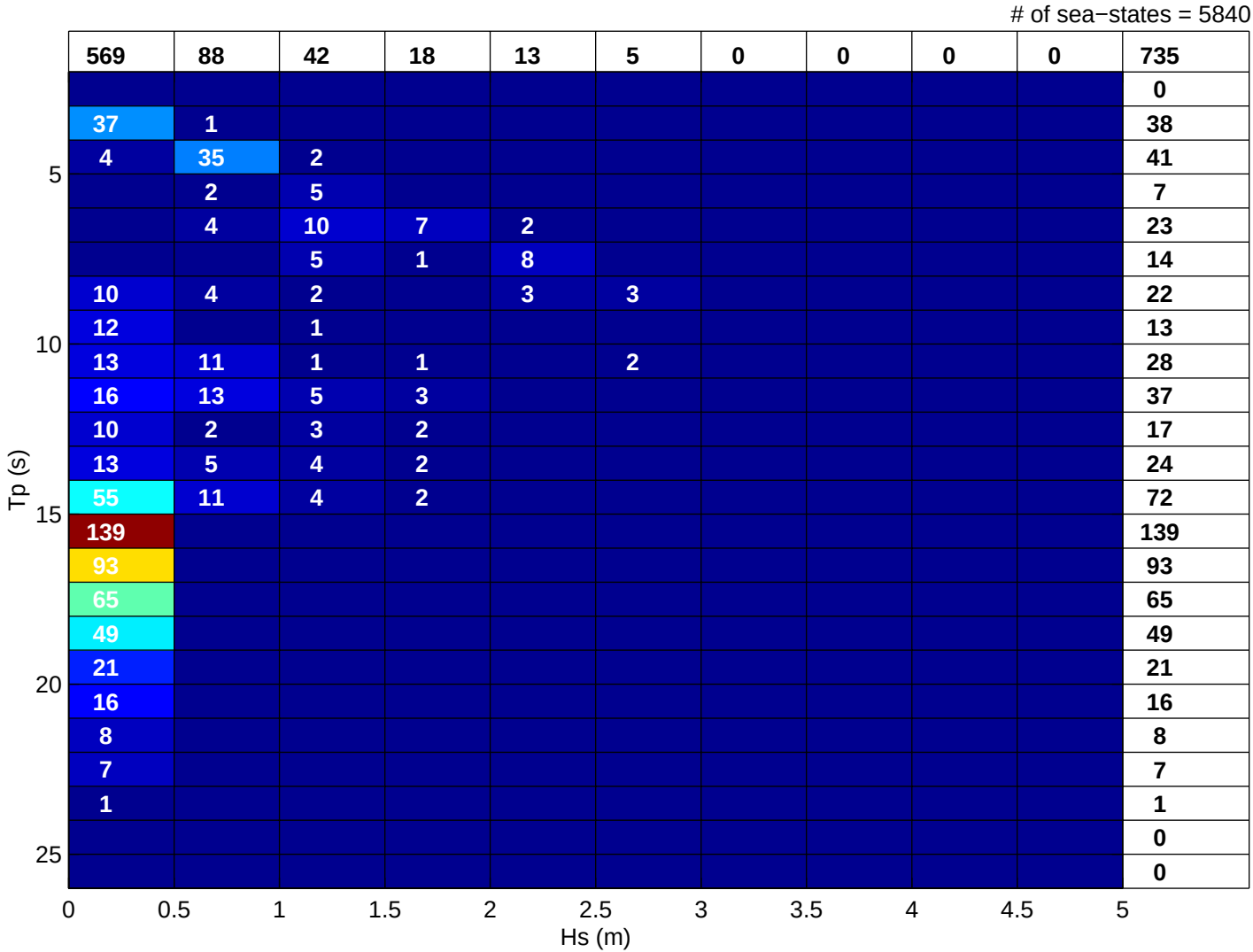
All the scatter diagrams have been plotted in using colors function of the percent of the maximum value.




Hindcast WANE 19573 − Wave systems
# of sea−states = 43824
61564 33489 10780 2409 443 125 43 0 0 0 108853
0
2364 2364
7448 227 7675
2763 3374 6137
1481 6337 158 7976
1519 2920 1640 26 6105
2454 2470 1824 255 21 7024
3195 2496 889 213 53 8 6854
4365 3811 1394 271 41 33 4 9919
4341 4221 1557 424 62 14 10 10629
2979 2222 847 254 47 4 6353
2773 1570 670 226 48 10 1 5298
4950 1824 980 359 81 32 6 8232
5399 989 500 224 63 20 14 7209
4274 251 62 22 1 3 4613
3610 435 161 103 24 3 5 4341
2383 147 55 25 1 1 2612
1930 96 32 6 1 2065
1036 56 10 1 1103
1160 30 1 1191
469 10 479
321 3 324
35 35
315 315
Tp (s)
5
10
15
20
25
0 1 2 3 4 5 6 7 8 9 10
Hs (m)


Hindcast WANE 19573 − Wave systems: 270°−360°
# of sea−states = 43824
8840 987 361 179 82 45 34 11 4 1 10544
0
315 5 320
154 393 15 562
19 62 74 3 158
33 56 67 44 5 205
85 69 40 16 32 7 249
108 69 35 29 17 17 9 284
132 70 29 15 5 5 11 5 272
144 78 26 14 13 6 2 6 1 290
108 59 26 24 2 8 10 2 239
98 37 14 8 2 1 160
172 16 6 8 3 205
1008 23 17 13 1 1062
2116 12 4 4 1 1 2138
1874 5 3 1882
1034 15 3 1 2 1 2 1058
713 9 2 724
329 7 336
194 2 196
83 83
65 65
23 23
1 1
32 32
5
10
15
20
25
Tp (s)
0 0.5 1 1.5 2 2.5 3 3.5 4 4.5 5
Hs (m)


Hindcast WANE QSCAT 19573 − Wave systems
# of sea−states = 5840
3899 3231 2727 1705 1032 584 248 73 36 6 13541
0
371 14 385
154 738 30 922
25 217 464 10 716
41 131 545 382 18 1117
68 106 167 268 168 18 795
140 124 153 197 219 110 18 961
137 251 191 146 99 71 28 2 925
222 416 260 144 124 95 48 20 3 1332
252 320 346 186 131 92 47 21 8 1403
245 178 174 105 70 44 20 11 6 853
207 155 130 67 60 46 13 6 9 693
268 216 133 116 81 55 38 10 10 6 933
398 173 73 46 33 33 25 3 784
322 62 12 7 7 4 1 415
317 54 19 14 16 13 9 442
179 20 10 10 3 3 1 226
166 21 9 3 3 202
106 16 5 3 130
119 10 2 1 132
66 5 2 73
44 3 2 49
3 3
49 1 50
Tp (s)
5
10
15
20
25
0 0.5 1 1.5 2 2.5 3 3.5 4 4.5 5
Hs (m)


Hindcast WANE QSCAT 19573 − Wave systems: 270°−360°
# of sea−states = 5840
569 88 42 18 13 5 0 0 0 0 735
0
37 1 38
4 35 2 41
2 5 7
4 10 7 2 23
5 1 8 14
10 4 2 3 3 22
12 1 13
13 11 1 1 2 28
16 13 5 3 37
10 2 3 2 17
13 5 4 2 24
55 11 4 2 72
139 139
93 93
65 65
49 49
21 21
16 16
8 8
7 7
1 1
0
0
5
10
15
20
25
Tp (s)
0 0.5 1 1.5 2 2.5 3 3.5 4 4.5 5
Hs (m)

Hindcast WANE 22917 − Wave systems

of sea−states = 43824

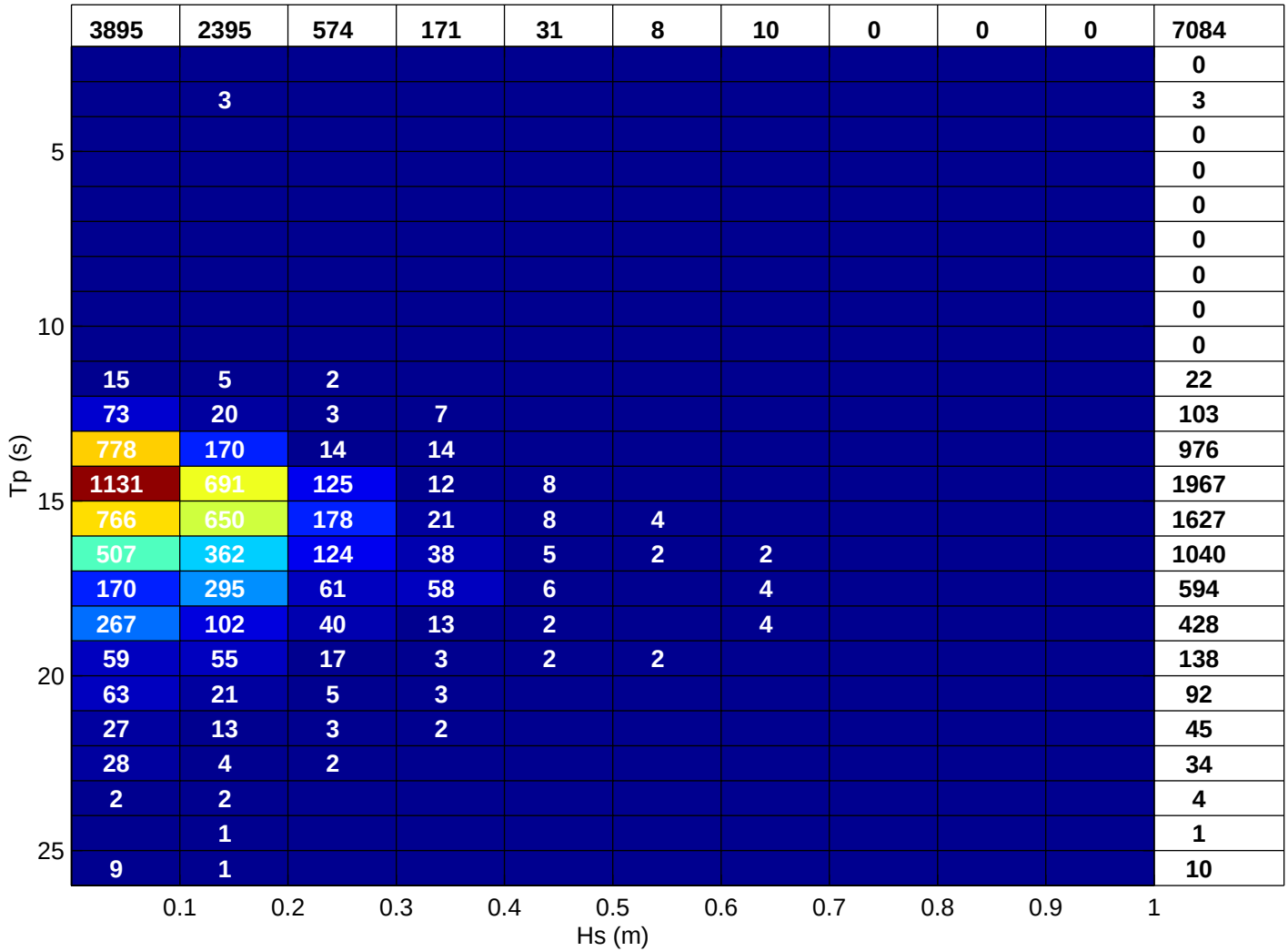
65836	38342	8867	775	75	11	0	0	0	0	113906
										0
284										284
2364	40									2404
2992	1339									4331
2196	8587	6								10789
1006	9817	680								11503
1517	6296	3662	72	1						11548
2714	1251	2014	126	2						6107
5191	1654	849	222	5						7921
6376	2390	466	149	28	4					9413
5602	1651	244	63	12						7572
5534	1437	205	37	8	1					7222
7871	1830	374	51	9	1					10136
6360	1040	215	29	6	5					7655
4385	330	39	4	2						4760
3838	411	80	17	2						4348
2459	145	24	5							2633
1852	78	7								1937
1116	27	2								1145
1087	12									1099
455	5									460
281	2									283
39										39
317										317

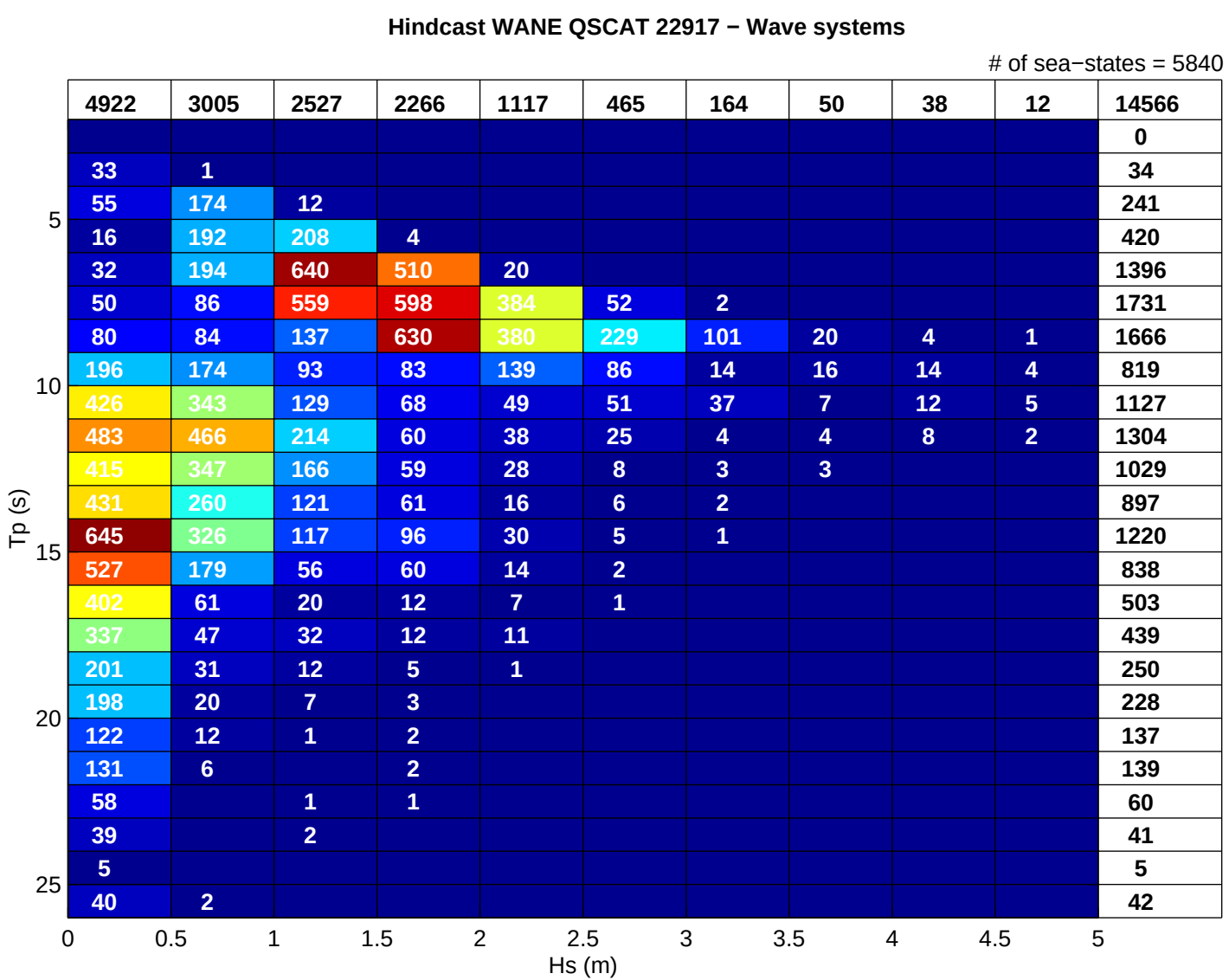
Tp (s)

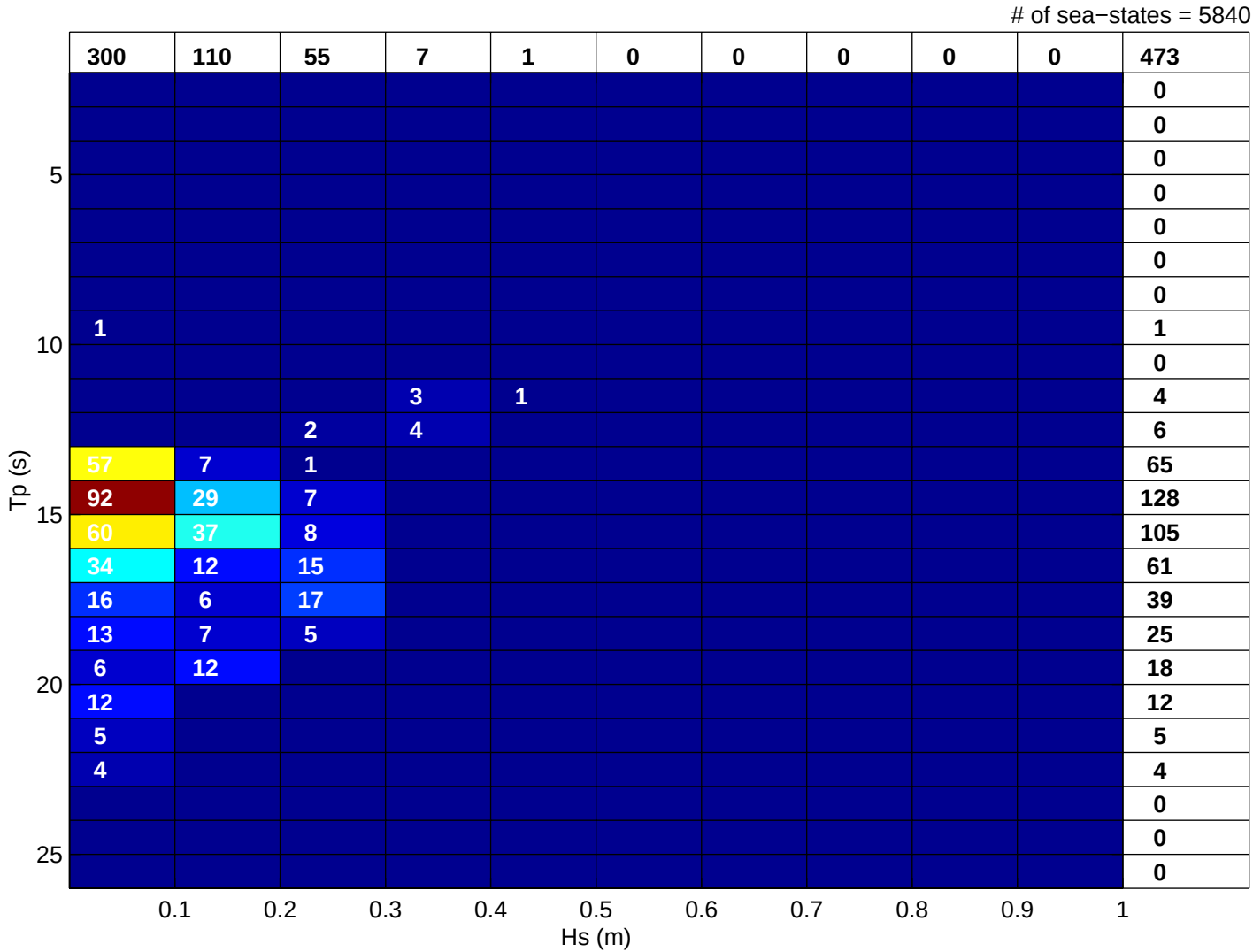
5 10 15 20 25

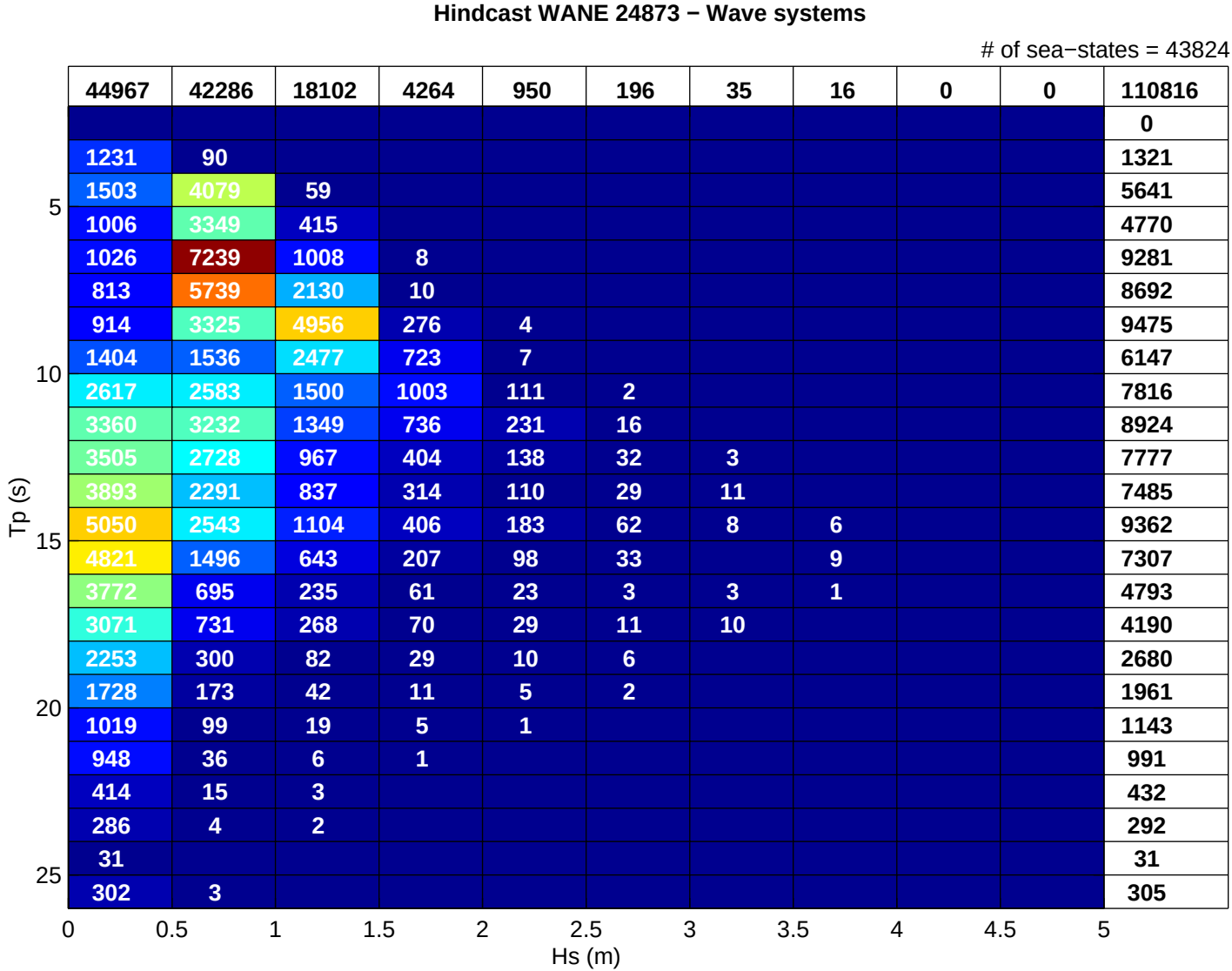
0 1 2 3 4 5 6 7 8 9 10

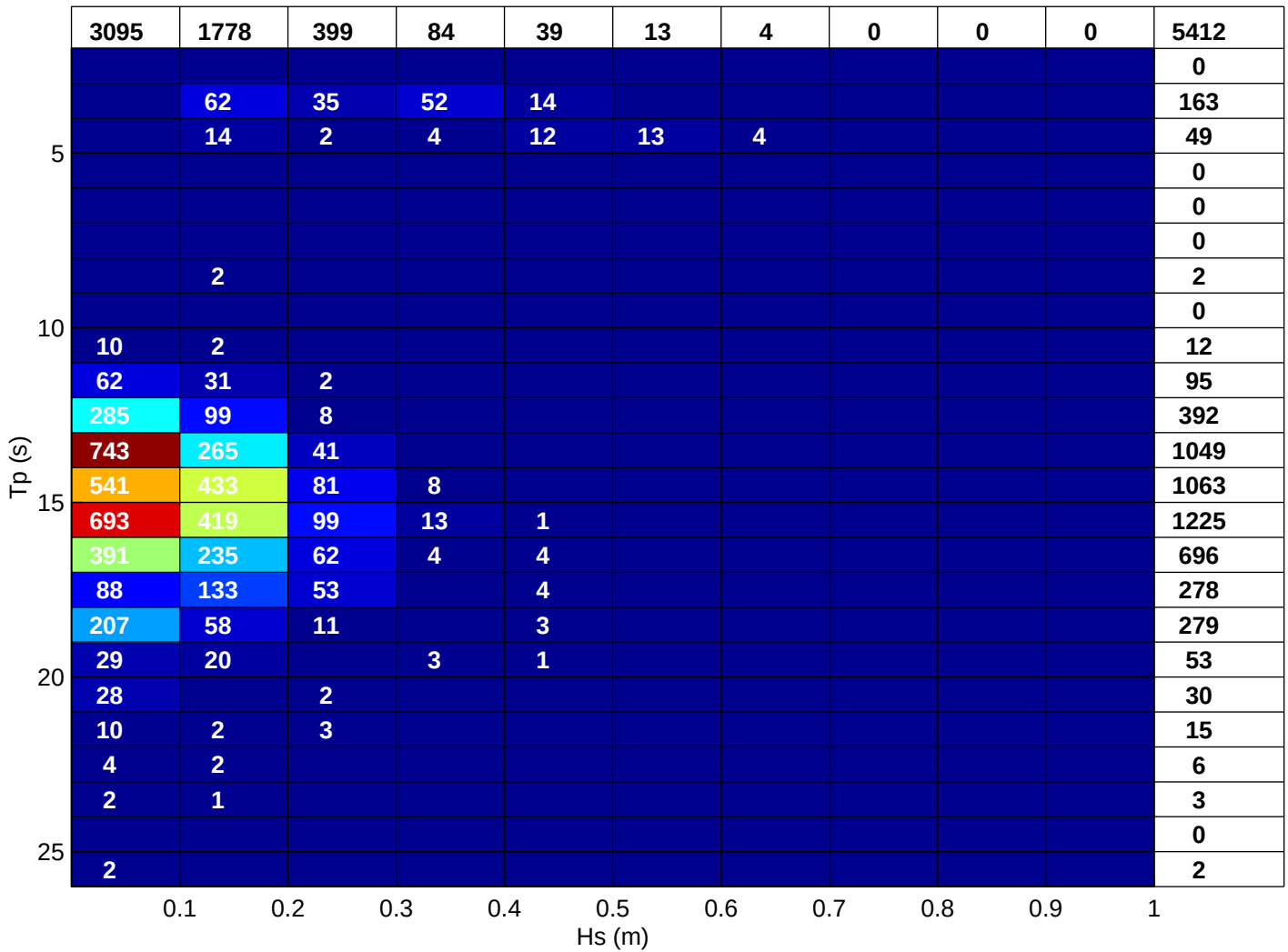
Hs (m)

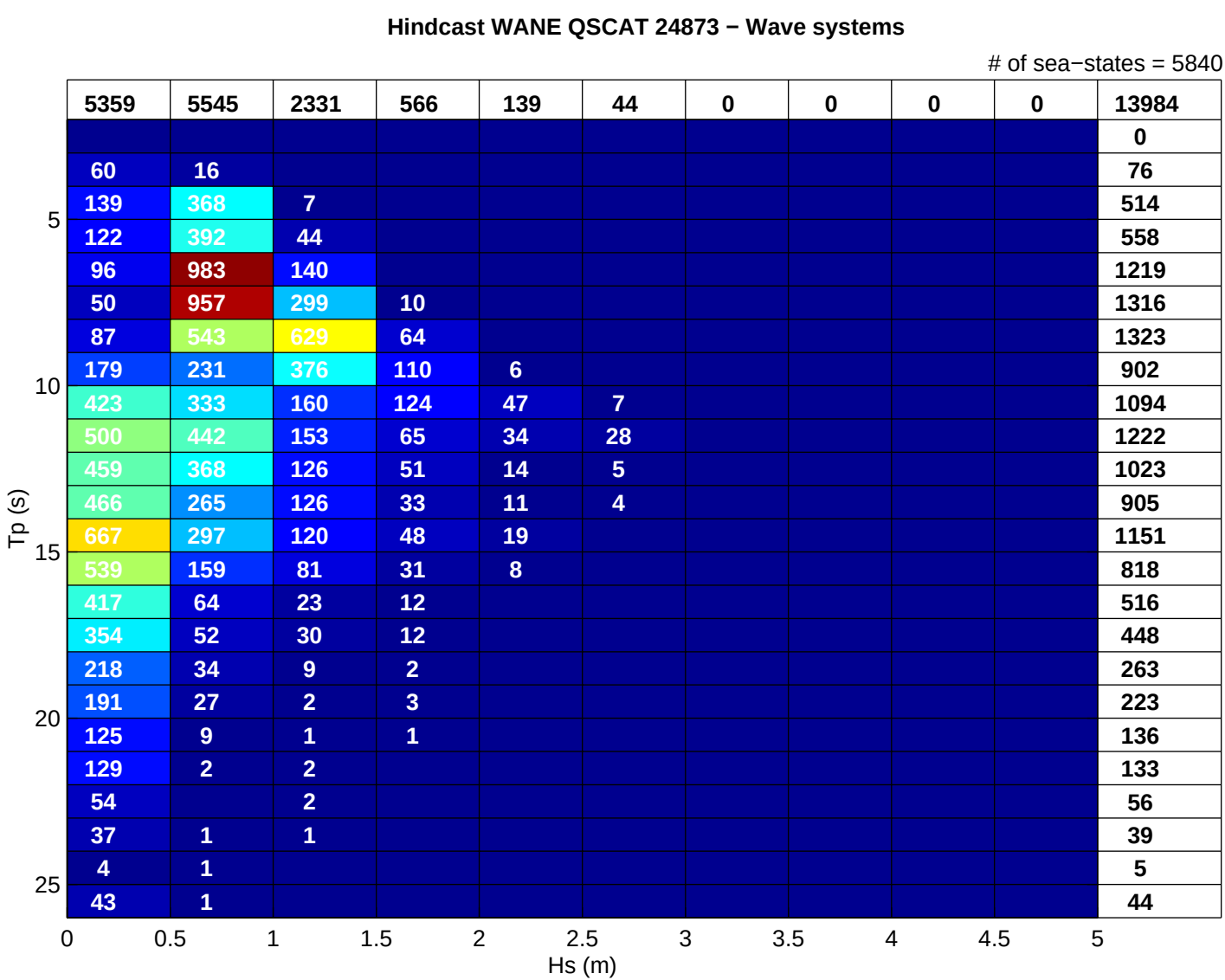

Hindcast WANE 22917 − Wave systems: 270°−360°
# of sea−states = 43824
3895 2395 574 171 31 8 10 0 0 0 7084
0
3 3
0
0
0
0
0
0
0
15 5 2 22
73 20 3 7 103
778 170 14 14 976
1131 691 125 12 8 1967
766 650 178 21 8 4 1627
507 362 124 38 5 2 2 1040
170 295 61 58 6 4 594
267 102 40 13 2 4 428
59 55 17 3 2 2 138
63 21 5 3 92
27 13 3 2 45
28 4 2 34
2 2 4
1 1
9 1 10
5
10
15
20
25
Tp (s)
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1
Hs (m)

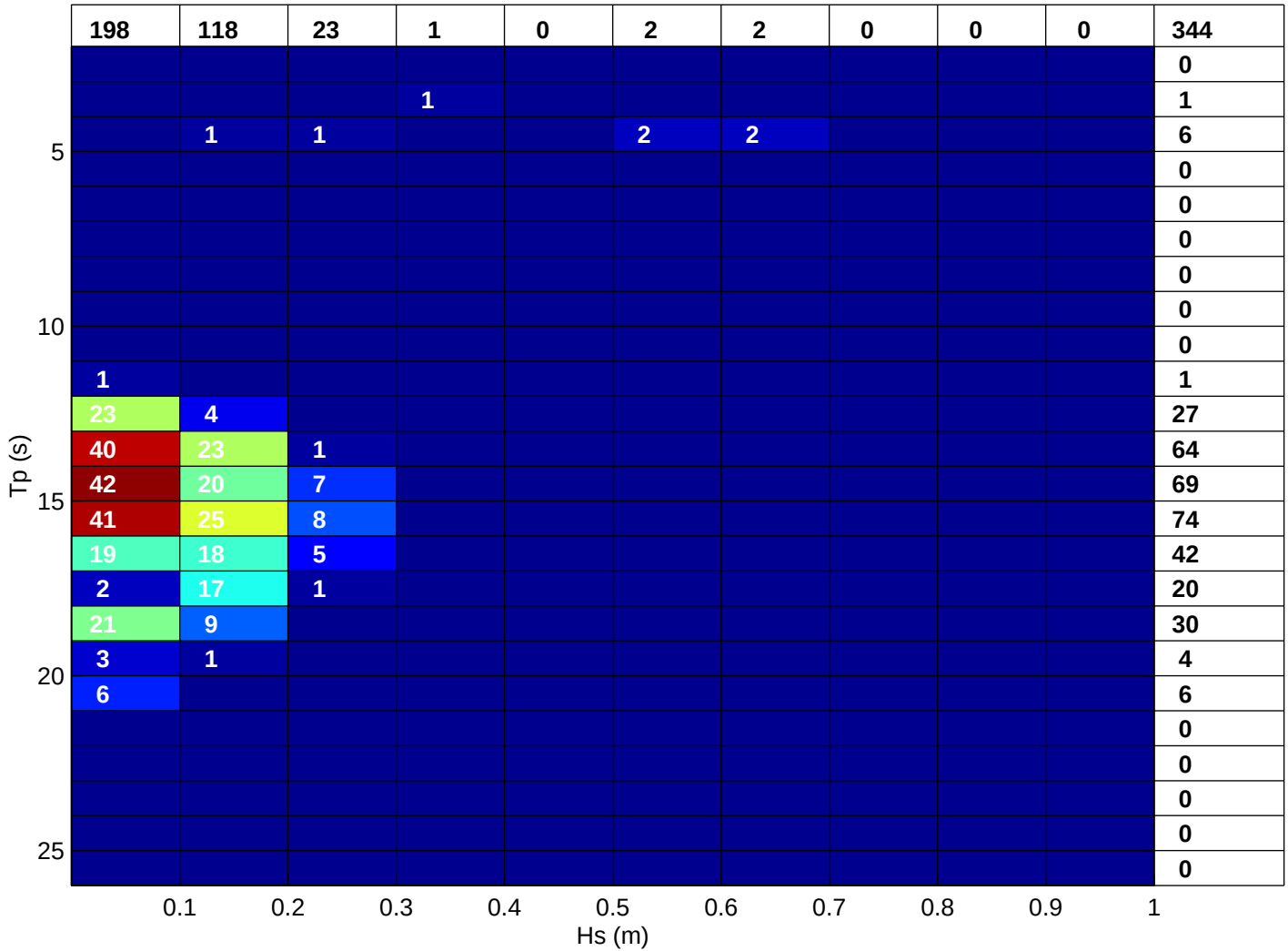

Hindcast WANE QSCAT 22917 − Wave systems
# of sea−states = 5840
4922 3005 2527 2266 1117 465 164 50 38 12 14566
0
33 1 34
55 174 12 241
16 192 208 4 420
32 194 640 510 20 1396
50 86 559 598 384 52 2 1731
80 84 137 630 380 229 101 20 4 1 1666
196 174 93 83 139 86 14 16 14 4 819
426 343 129 68 49 51 37 7 12 5 1127
483 466 214 60 38 25 4 4 8 2 1304
415 347 166 59 28 8 3 3 1029
431 260 121 61 16 6 2 897
645 326 117 96 30 5 1 1220
527 179 56 60 14 2 838
402 61 20 12 7 1 503
337 47 32 12 11 439
201 31 12 5 1 250
198 20 7 3 228
122 12 1 2 137
131 6 2 139
58 1 1 60
39 2 41
5 5
40 2 42
5
10
15
20
25
Tp (s)
0 0.5 1 1.5 2 2.5 3 3.5 4 4.5 5
Hs (m)

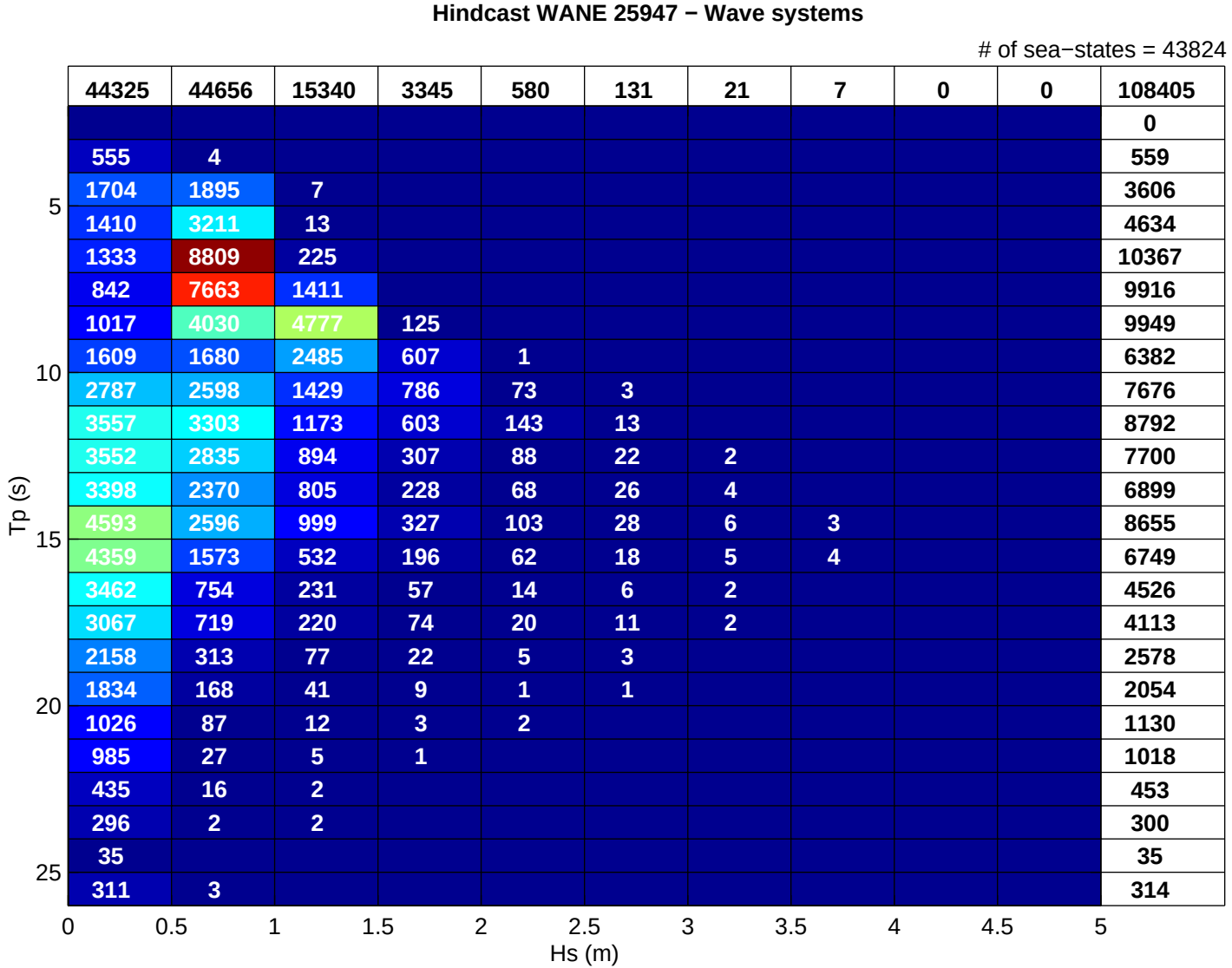

Hindcast WANE QSCAT 22917 − Wave systems: 270°−360°
# of sea−states = 5840
300 110 55 7 1 0 0 0 0 0 473
0 0 0 0 0 0 0 1 0 4 6 65 128 105 61 39 25 18 12 5 4 0 0 0
1 3 1 2 4 57 7 1 92 29 7 60 37 8 34 12 15 16 6 17 13 7 5 6 12 12 5 4
5 10 15 20 25
Tp (s)
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1
Hs (m)

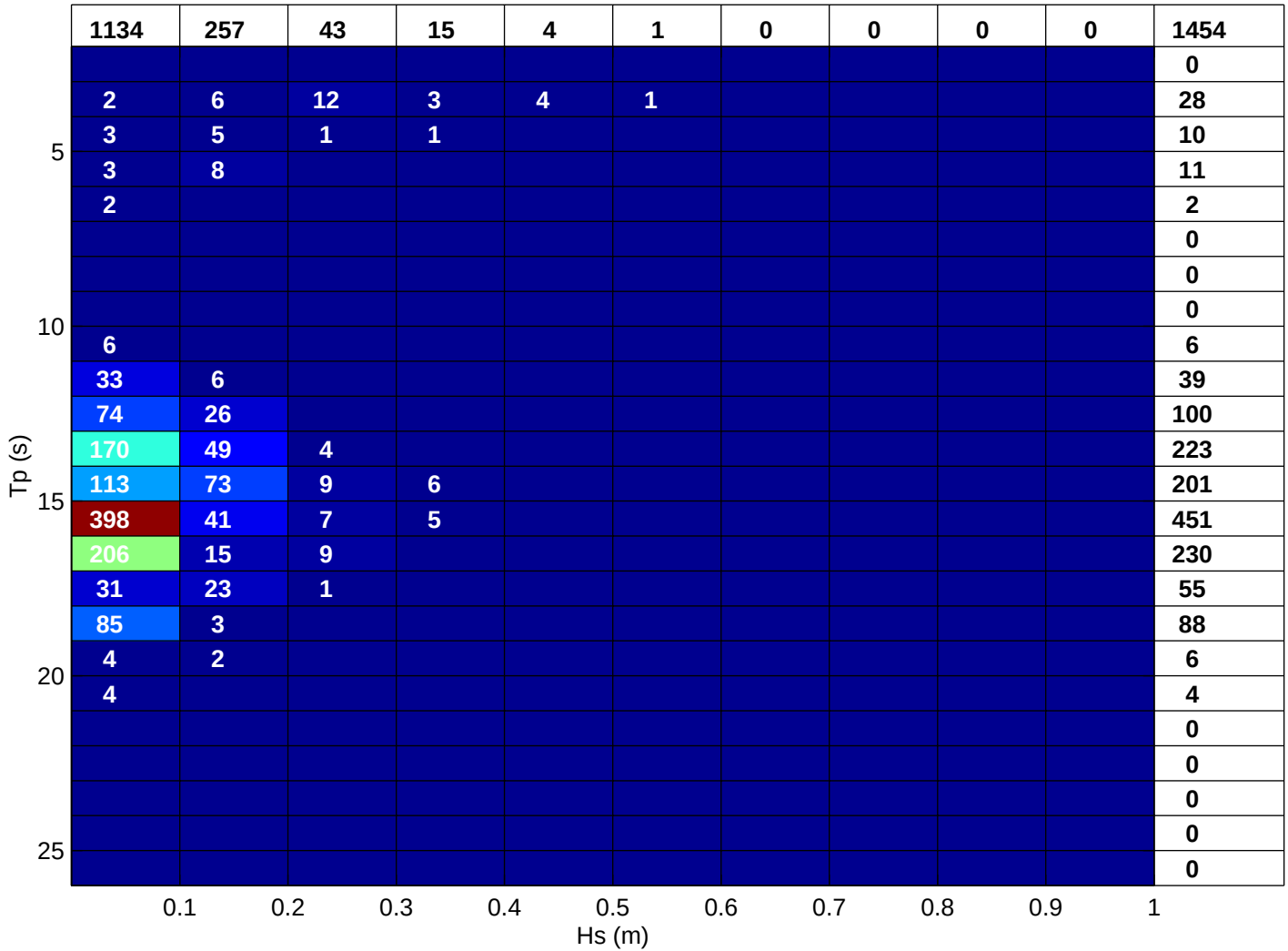

Hindcast WANE 24873 − Wave systems
# of sea−states = 43824
44967 42286 18102 4264 950 196 35 16 0 0 110816
0
1231 90 1321
1503 4079 59 5641
1006 3349 415 4770
1026 7239 1008 8 9281
813 5739 2130 10 8692
914 3325 4956 276 4 9475
1404 1536 2477 723 7 6147
2617 2583 1500 1003 111 2 7816
3360 3232 1349 736 231 16 8924
3505 2728 967 404 138 32 3 7777
3893 2291 837 314 110 29 11 7485
5050 2543 1104 406 183 62 8 6 9362
4821 1496 643 207 98 33 9 7307
3772 695 235 61 23 3 3 1 4793
3071 731 268 70 29 11 10 4190
2253 300 82 29 10 6 2680
1728 173 42 11 5 2 1961
1019 99 19 5 1 1143
948 36 6 1 991
414 15 3 432
286 4 2 292
31 31
302 3 305
5
10
15
20
25
Tp (s)
0 0.5 1 1.5 2 2.5 3 3.5 4 4.5 5
Hs (m)

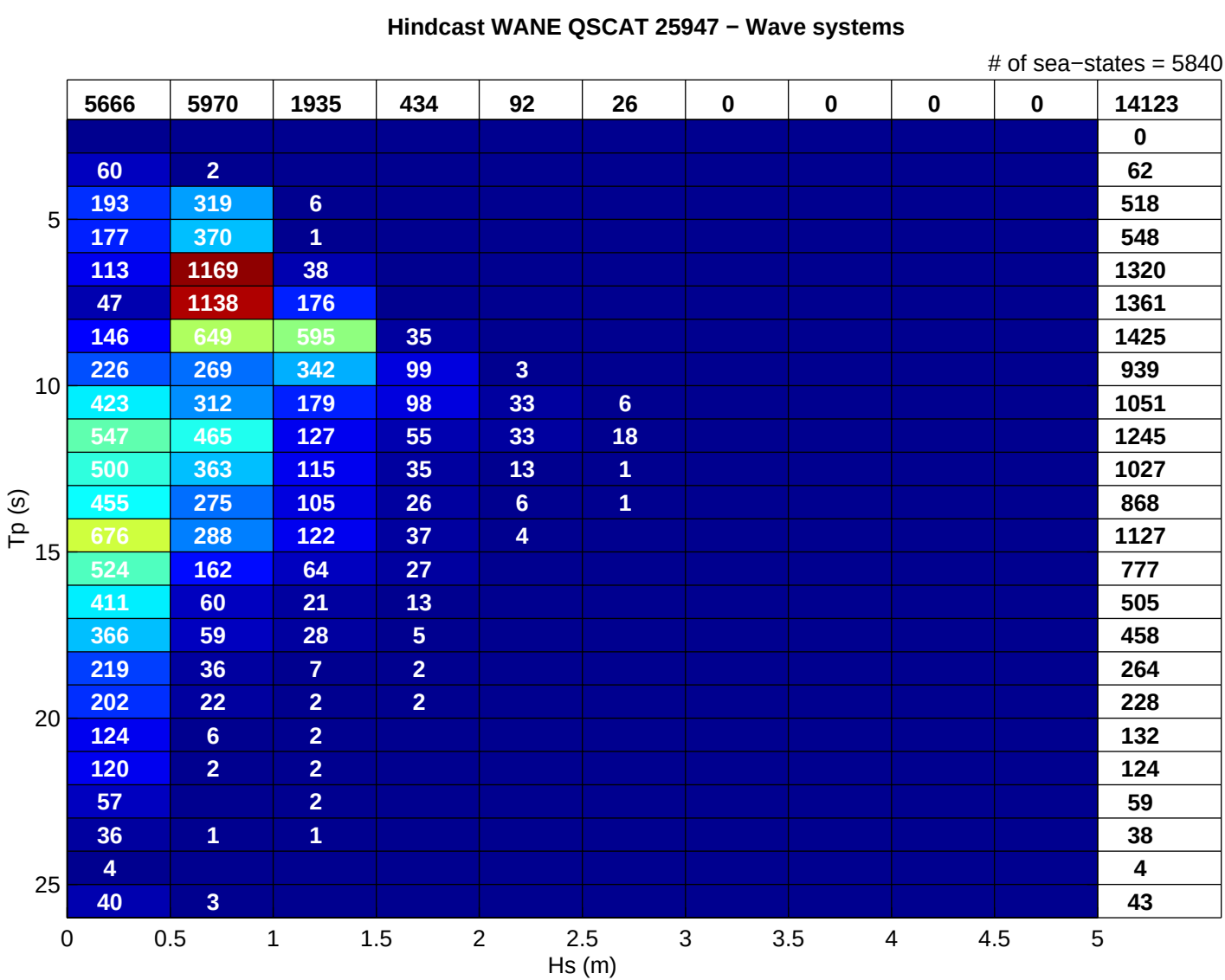

Hindcast WANE 24873 − Wave systems: 270°−360°
# of sea−states = 43824
3095 1778 399 84 39 13 4 0 0 0 5412
0
62 35 52 14 163
14 2 4 12 13 4 49
0
0
0
2 2
0
10 2 12
62 31 2 95
285 99 8 392
743 265 41 1049
541 433 81 8 1063
693 419 99 13 1 1225
391 235 62 4 4 696
88 133 53 4 278
207 58 11 3 279
29 20 3 1 53
28 2 30
10 2 3 15
4 2 6
2 1 3
0
2 2
5
10
15
20
25
Tp (s)
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
Hs (m)

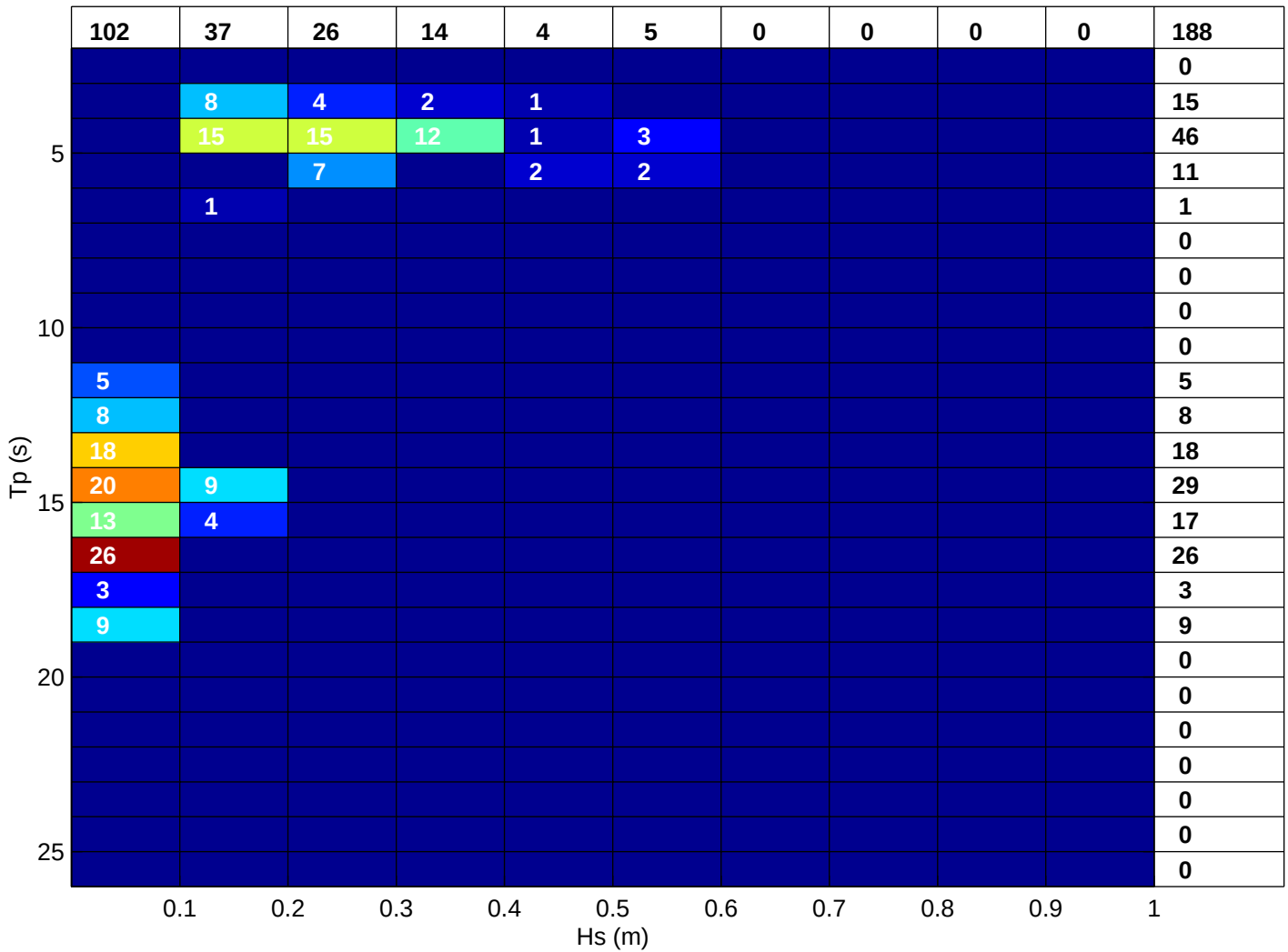

Hindcast WANE QSCAT 24873 − Wave systems
# of sea−states = 5840
5359 5545 2331 566 139 44 0 0 0 0 13984
0
60 16 76
139 368 7 514
122 392 44 558
96 983 140 1219
50 957 299 10 1316
87 543 629 64 1323
179 231 376 110 6 902
423 333 160 124 47 7 1094
500 442 153 65 34 28 1222
459 368 126 51 14 5 1023
466 265 126 33 11 4 905
667 297 120 48 19 1151
539 159 81 31 8 818
417 64 23 12 516
354 52 30 12 448
218 34 9 2 263
191 27 2 3 223
125 9 1 1 136
129 2 2 133
54 2 56
37 1 1 39
4 1 5
43 1 44
5
10
15
20
25
Tp (s)
0 0.5 1 1.5 2 2.5 3 3.5 4 4.5 5
Hs (m)

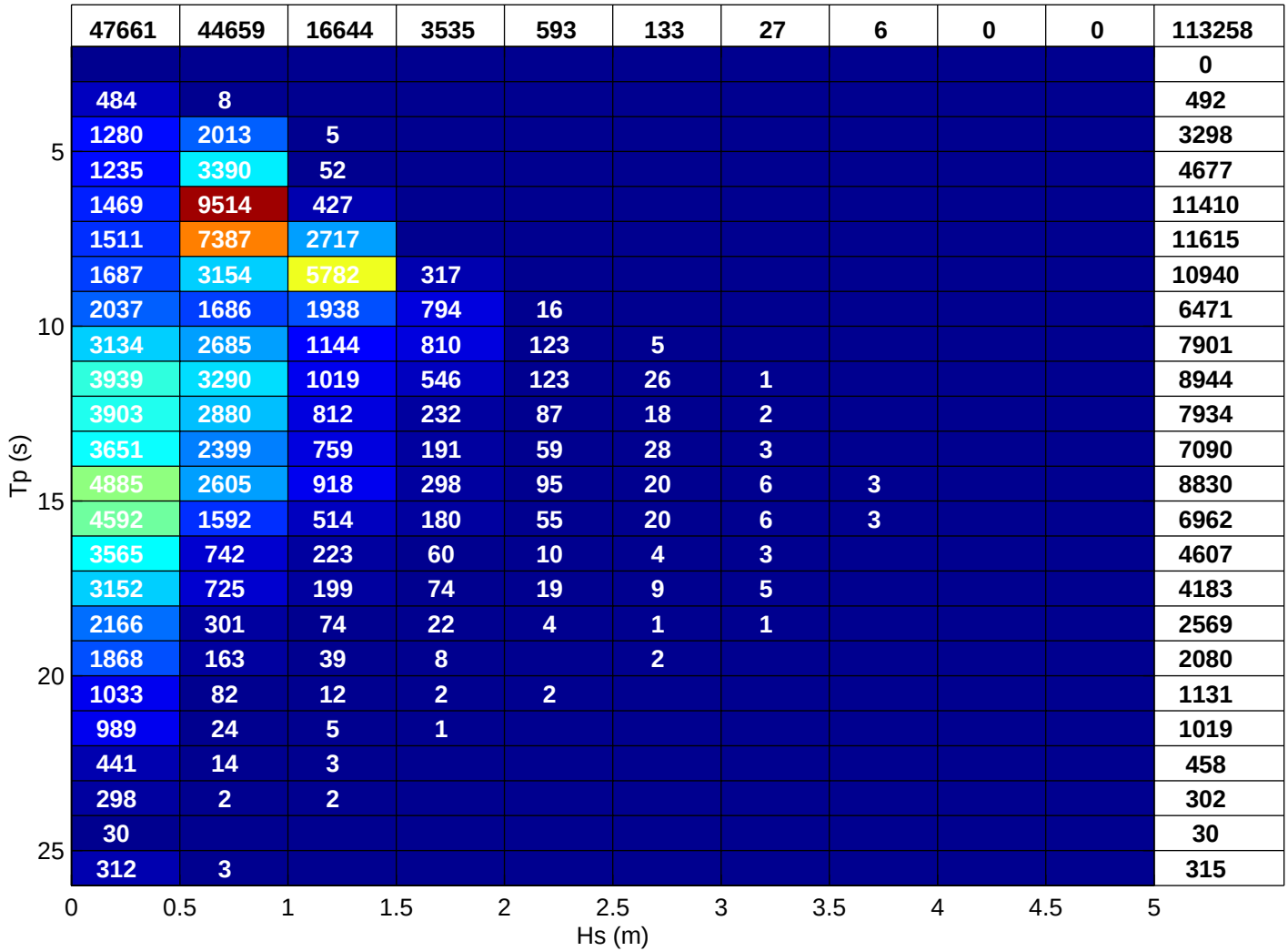

Hindcast WANE QSCAT 24873 − Wave systems: 270°−360°
# of sea−states = 5840
198 118 23 1 0 2 2 0 0 0 344
0
1
1 1 2 2
6
0
0
0
0
0
0
0
1
23 4
27
40 23 1
64
42 20 7
69
41 25 8
74
19 18 5
42
2 17 1
20
21 9
30
3 1
4
6
6
0
0
0
0
0
5
10
15
20
25
Tp (s)
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1
Hs (m)

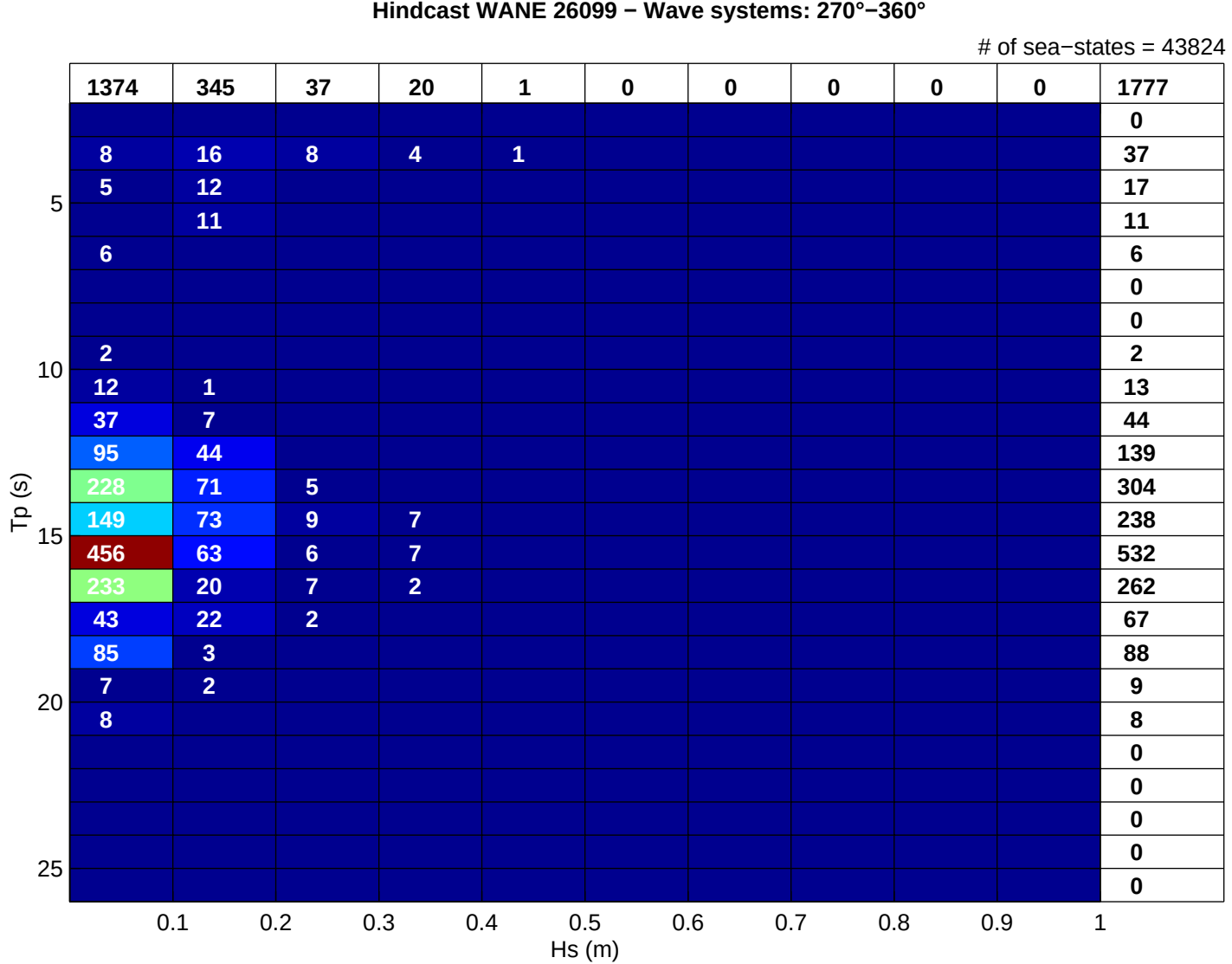

Hindcast WANE 25947 − Wave systems
# of sea−states = 43824
44325 44656 15340 3345 580 131 21 7 0 0 108405
0
555 4 559
1704 1895 7 3606
1410 3211 13 4634
1333 8809 225 10367
842 7663 1411 9916
1017 4030 4777 125 9949
1609 1680 2485 607 1 6382
2787 2598 1429 786 73 3 7676
3557 3303 1173 603 143 13 8792
3552 2835 894 307 88 22 2 7700
3398 2370 805 228 68 26 4 6899
4593 2596 999 327 103 28 6 3 8655
4359 1573 532 196 62 18 5 4 6749
3462 754 231 57 14 6 2 4526
3067 719 220 74 20 11 2 4113
2158 313 77 22 5 3 2578
1834 168 41 9 1 1 2054
1026 87 12 3 2 1130
985 27 5 1 1018
435 16 2 453
296 2 2 300
35 35
311 3 314
Tp (s)
5
10
15
20
25
0 0.5 1 1.5 2 2.5 3 3.5 4 4.5 5
Hs (m)

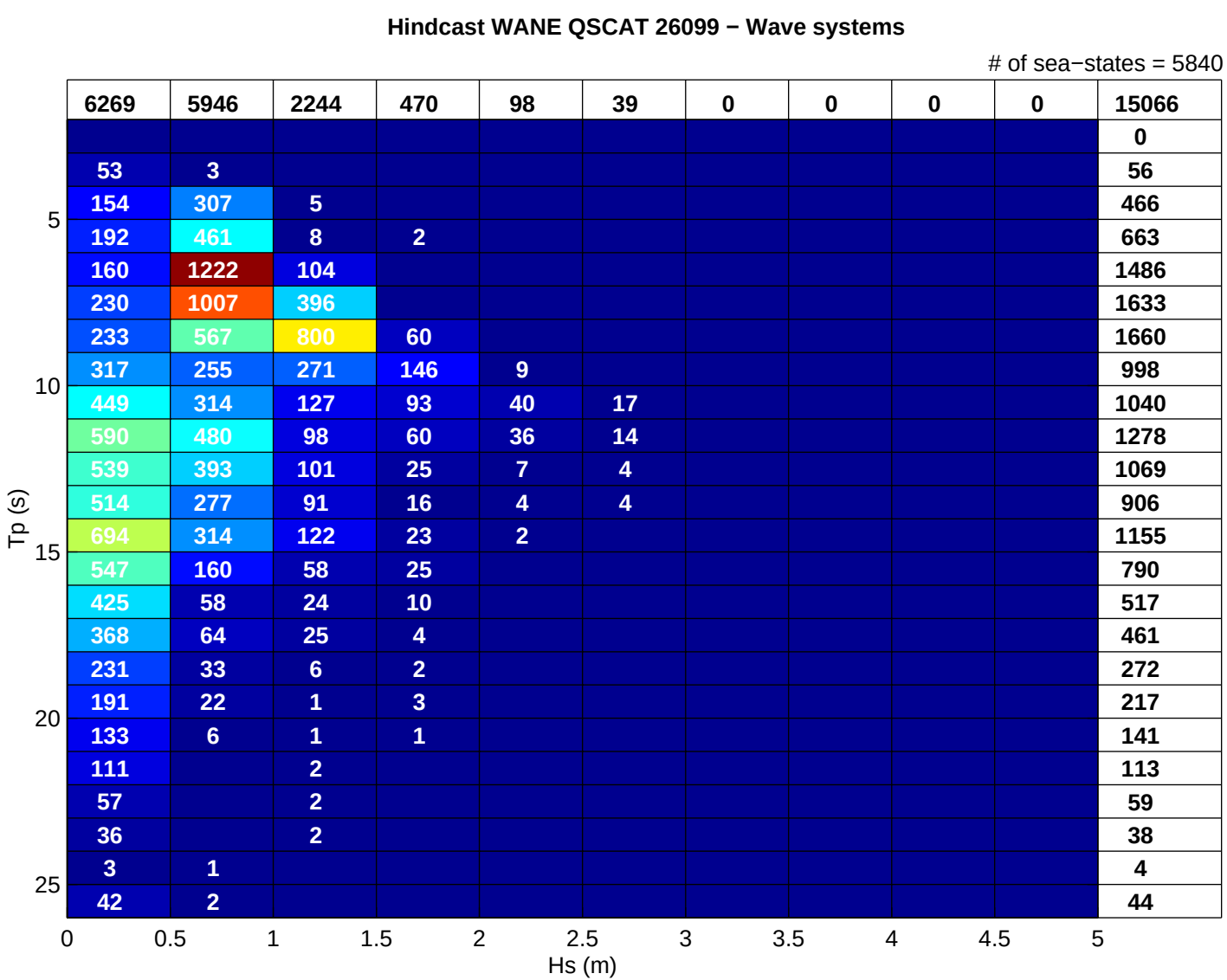

Hindcast WANE 25947 − Wave systems: 270°−360°
# of sea−states = 43824
1134 257 43 15 4 1 0 0 0 0 1454
0
2 6 12 3 4 1 28
3 5 1 1 10
3 8 11
2 2
0
0
0
6 6
33 6 39
74 26 100
170 49 4 223
113 73 9 6 201
398 41 7 5 451
206 15 9 230
31 23 1 55
85 3 88
4 2 6
4 4
0
0
0
0
0
5
10
15
20
25
Tp (s)
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1
Hs (m)

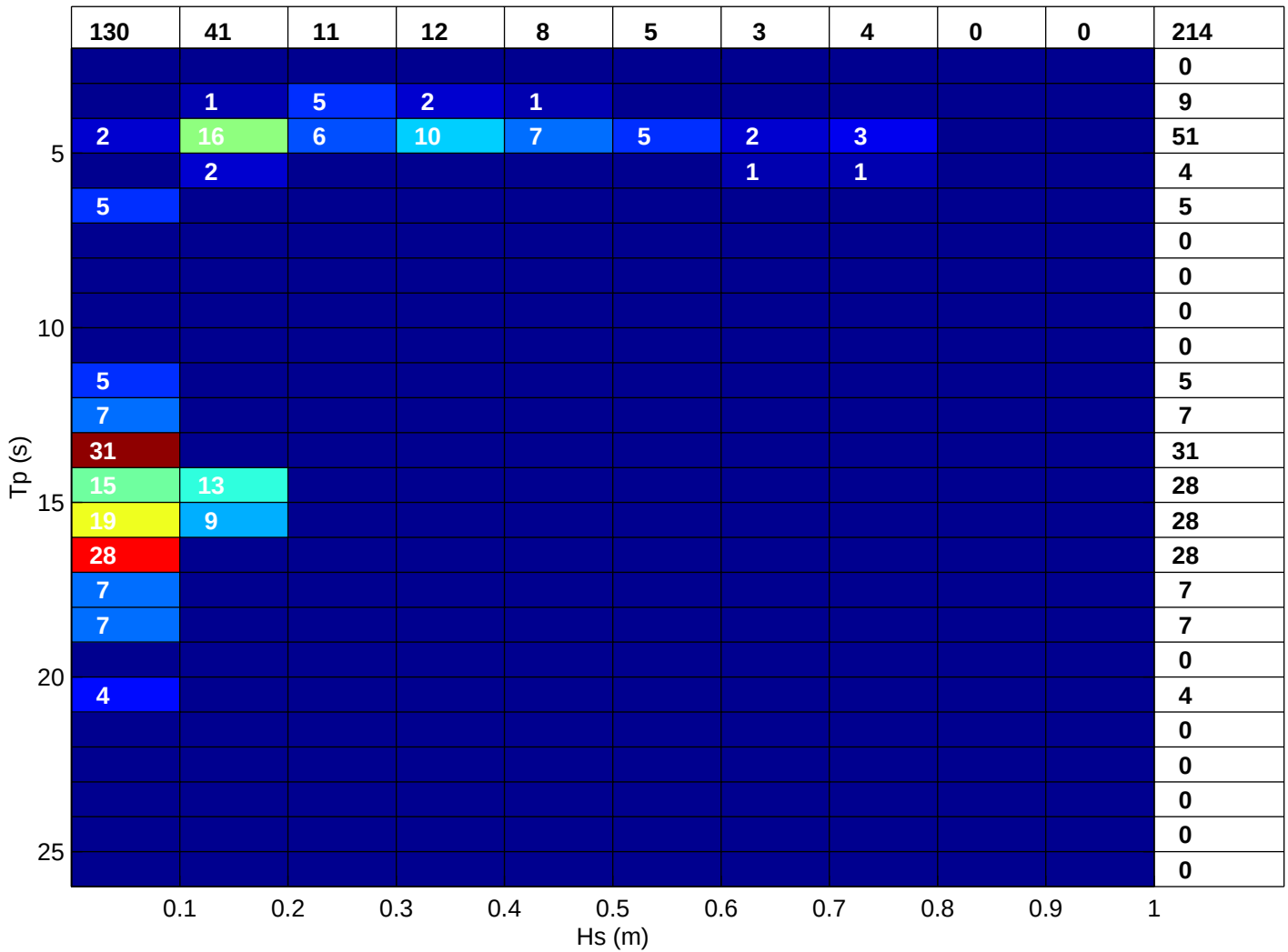

Hindcast WANE QSCAT 25947 − Wave systems
# of sea−states = 5840
5666 5970 1935 434 92 26 0 0 0 0 14123
0
60 2 62
193 319 6 518
177 370 1 548
113 1169 38 1320
47 1138 176 1361
146 649 595 35 1425
226 269 342 99 3 939
423 312 179 98 33 6 1051
547 465 127 55 33 18 1245
500 363 115 35 13 1 1027
455 275 105 26 6 1 868
676 288 122 37 4 1127
524 162 64 27 777
411 60 21 13 505
366 59 28 5 458
219 36 7 2 264
202 22 2 2 228
124 6 2 132
120 2 2 124
57 2 59
36 1 1 38
4 4
40 3 43
5
10
15
20
25
Tp (s)
0 0.5 1 1.5 2 2.5 3 3.5 4 4.5 5
Hs (m)

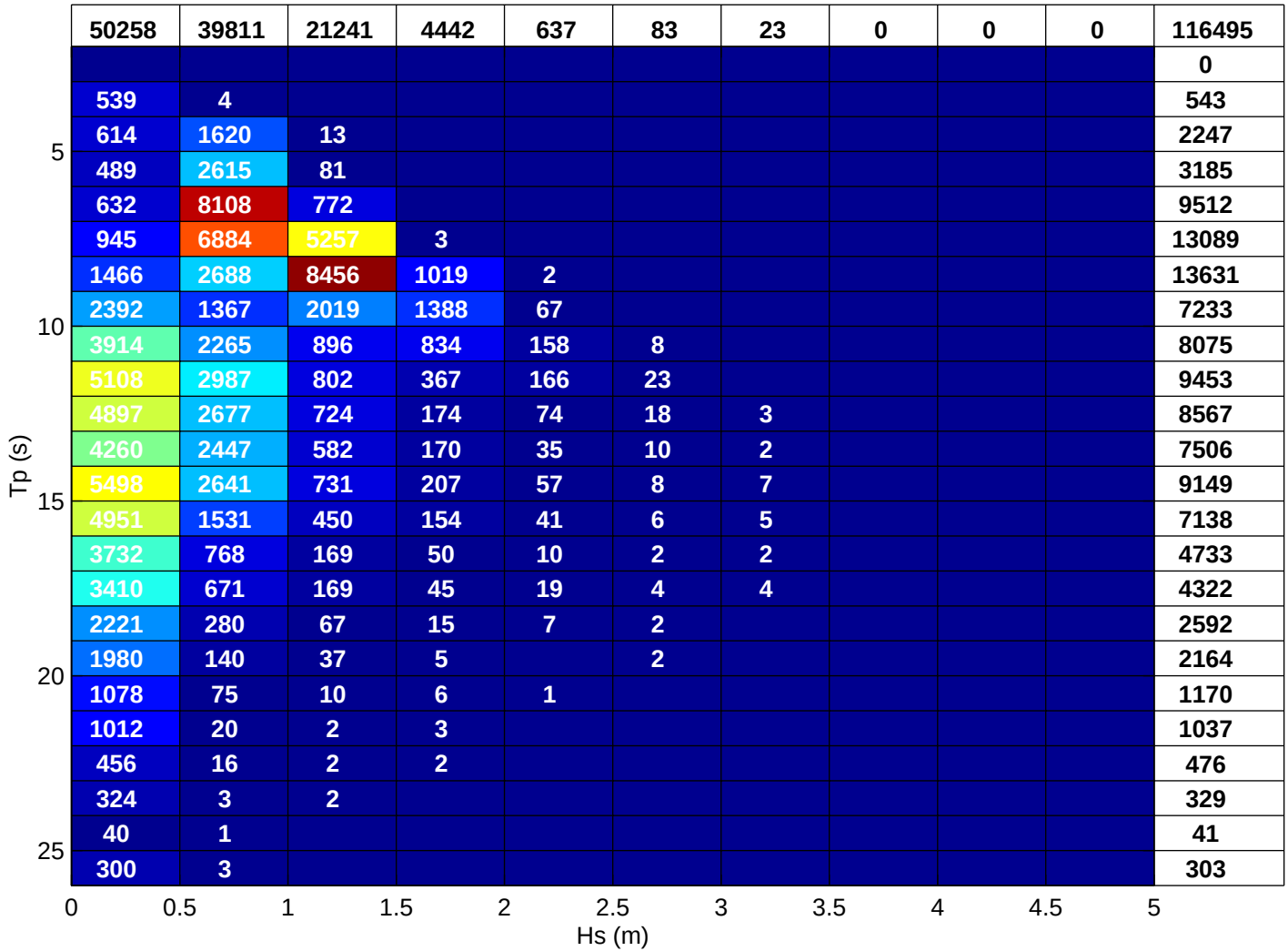

Hindcast WANE QSCAT 25947 − Wave systems: 270°−360°
# of sea−states = 5840
102 37 26 14 4 5 0 0 0 0 188
0
8 4 2 1
15
15 15 12 1 3
46
7 2 2
11
1
1
0
0
0
10
0
5
5
8
8
18
18
20 9
29
13 4
17
26
26
3
3
9
9
0
20
0
0
0
0
0
25
0
Tp (s)
5
10
15
20
25
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1
Hs (m)

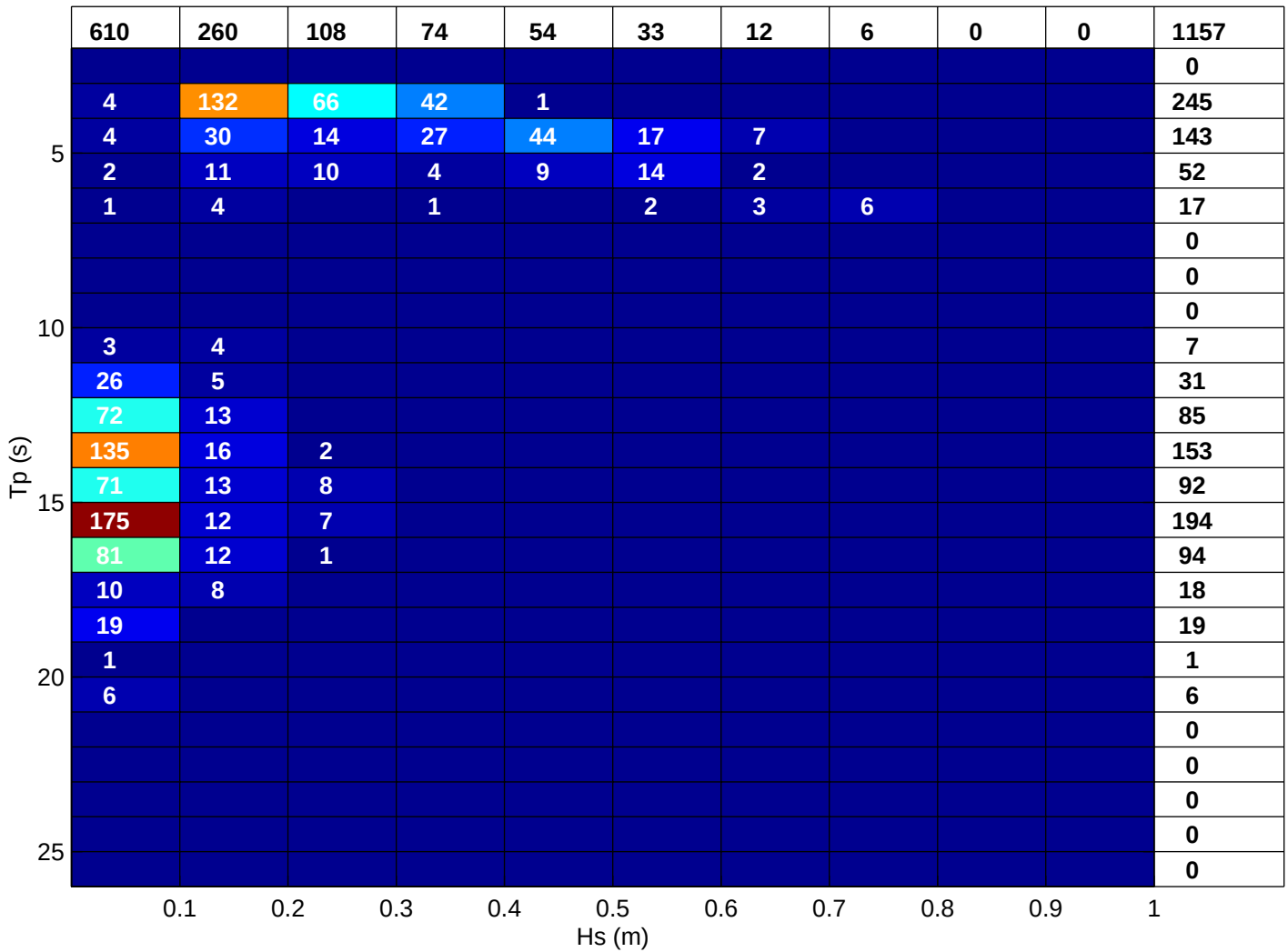

Hindcast WANE 26099 − Wave systems
# of sea−states = 43824
47661 44659 16644 3535 593 133 27 6 0 0 113258
0
484 8 492
1280 2013 5 3298
1235 3390 52 4677
1469 9514 427 11410
1511 7387 2717 11615
1687 3154 5782 317 10940
2037 1686 1938 794 16 6471
3134 2685 1144 810 123 5 7901
3939 3290 1019 546 123 26 1 8944
3903 2880 812 232 87 18 2 7934
3651 2399 759 191 59 28 3 7090
4885 2605 918 298 95 20 6 3 8830
4592 1592 514 180 55 20 6 3 6962
3565 742 223 60 10 4 3 4607
3152 725 199 74 19 9 5 4183
2166 301 74 22 4 1 1 2569
1868 163 39 8 2 2080
1033 82 12 2 2 1131
989 24 5 1 1019
441 14 3 458
298 2 2 302
30 30
312 3 315
5
10
15
20
25
Tp (s)
0 0.5 1 1.5 2 2.5 3 3.5 4 4.5 5
Hs (m)

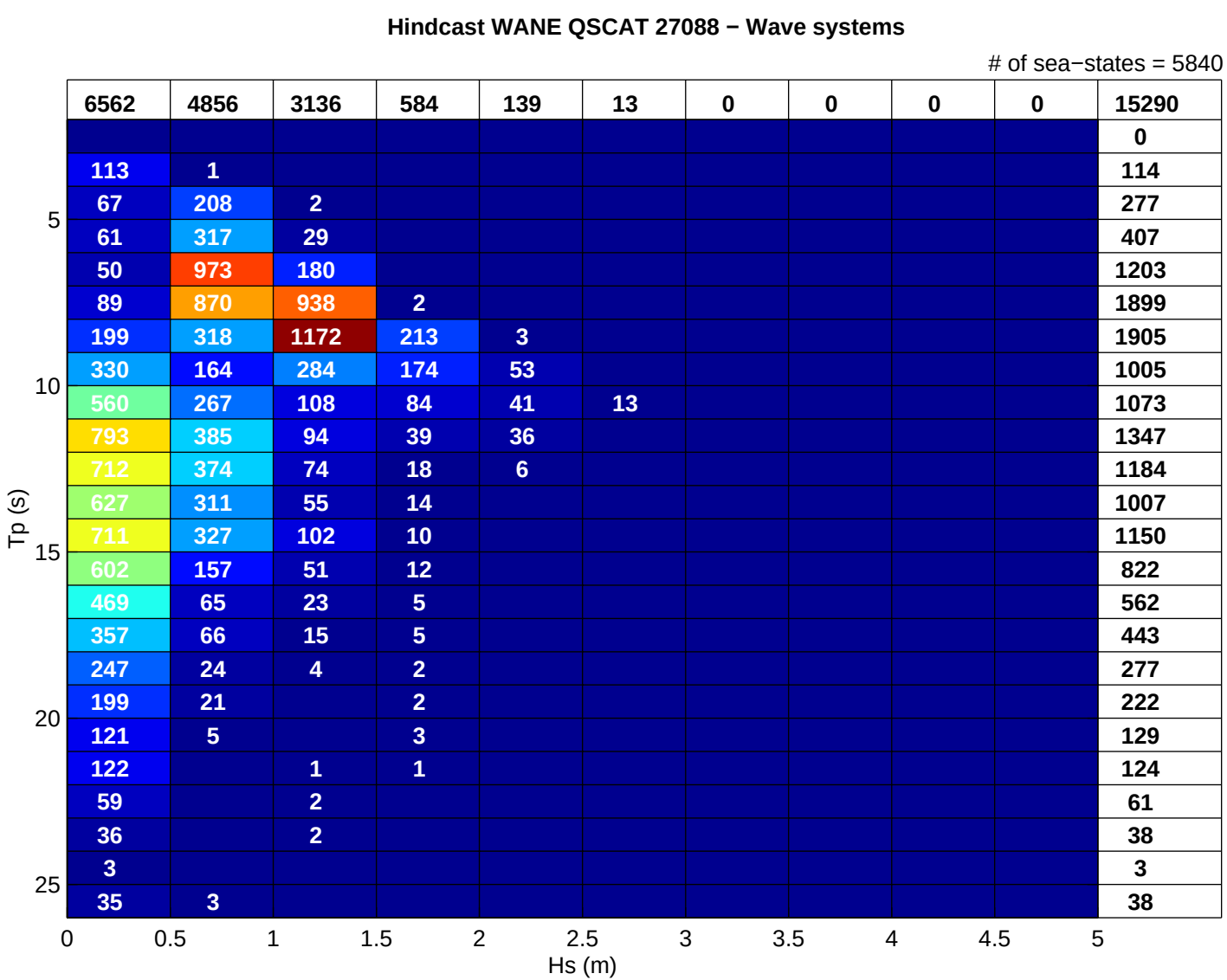

Hindcast WANE 26099 − Wave systems: 270°−360°
# of sea−states = 43824
1374 345 37 20 1 0 0 0 0 0 1777
0
8 16 8 4 1 37
5 12 17
11 11
6 6
0
0
2 2
12 1 13
37 7 44
95 44 139
228 71 5 304
149 73 9 7 238
456 63 6 7 532
233 20 7 2 262
43 22 2 67
85 3 88
7 2 9
8 8
0
0
0
0
0
5
10
15
20
25
Tp (s)
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1
Hs (m)

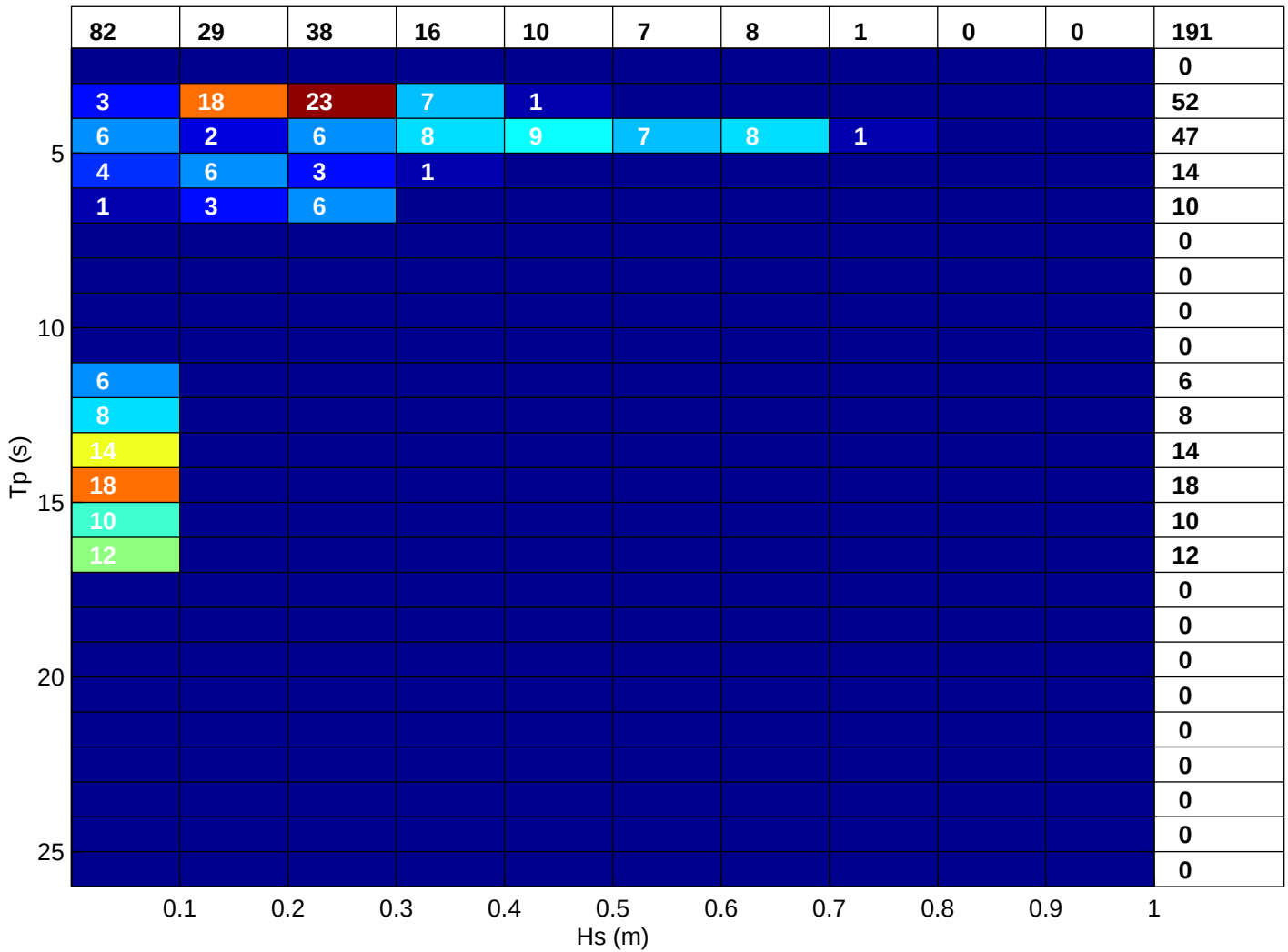

Hindcast WANE QSCAT 26099 − Wave systems
# of sea−states = 5840
6269 5946 2244 470 98 39 0 0 0 0 15066
0
53 3 56
154 307 5 466
192 461 8 2 663
160 1222 104 1486
230 1007 396 1633
233 567 800 60 1660
317 255 271 146 9 998
449 314 127 93 40 17 1040
590 480 98 60 36 14 1278
539 393 101 25 7 4 1069
514 277 91 16 4 4 906
694 314 122 23 2 1155
547 160 58 25 790
425 58 24 10 517
368 64 25 4 461
231 33 6 2 272
191 22 1 3 217
133 6 1 1 141
111 2 113
57 2 59
36 2 38
3 1 4
42 2 44
5
10
15
20
25
Tp (s)
0 0.5 1 1.5 2 2.5 3 3.5 4 4.5 5
Hs (m)

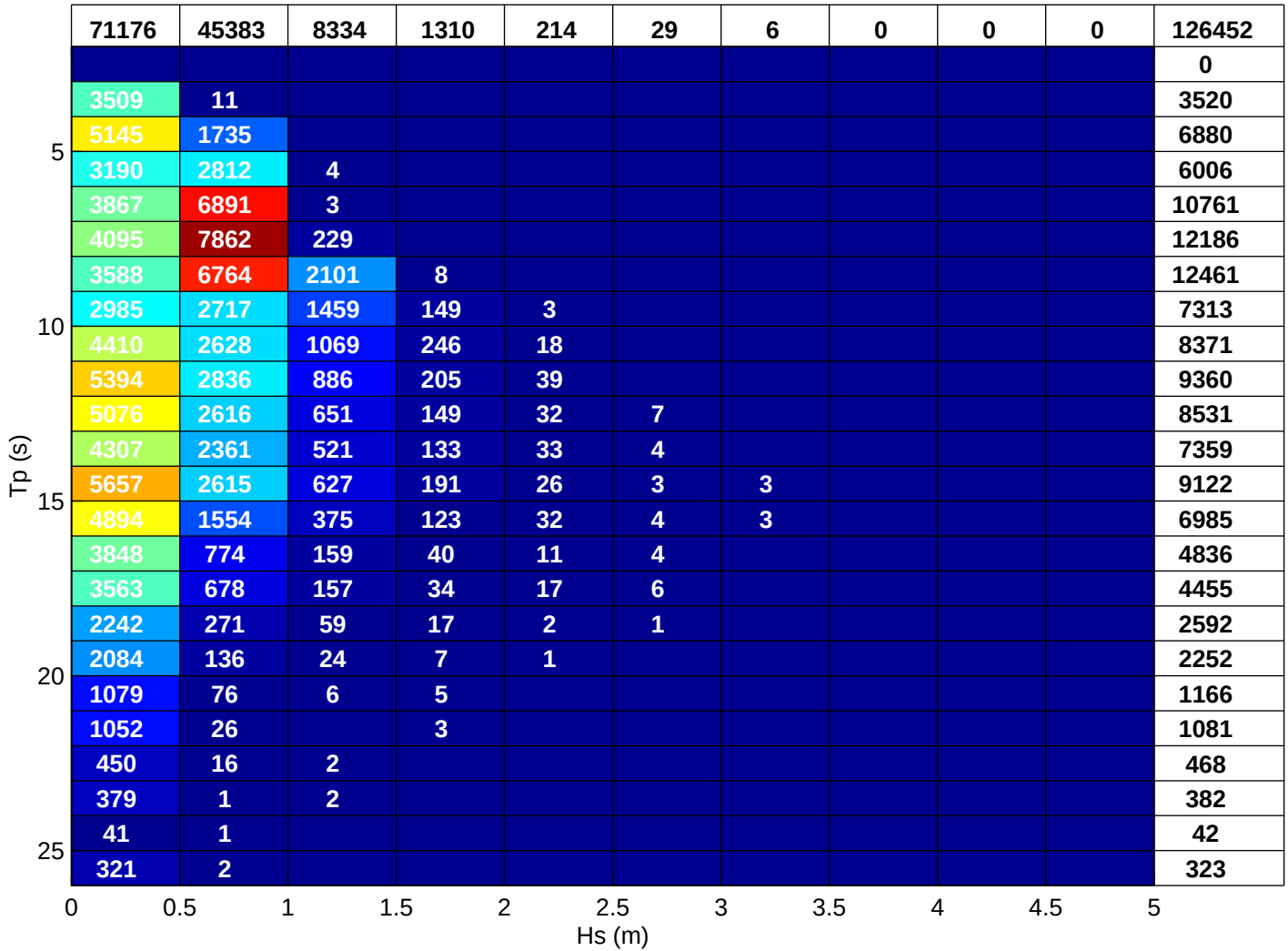

Hindcast WANE QSCAT 26099 − Wave systems: 270°−360°
# of sea−states = 5840
130 41 11 12 8 5 3 4 0 0 214
0
1 5 2 1 9
2 16 6 10 7 5 2 3 51
2 1 1 4
5 5
0
0
0
0
0
5 5
7 7
31 31
15 13 28
19 9 28
28 28
7 7
7 7
0
4 4
0
0
0
0
0
5
10
15
20
25
Tp (s)
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1
Hs (m)

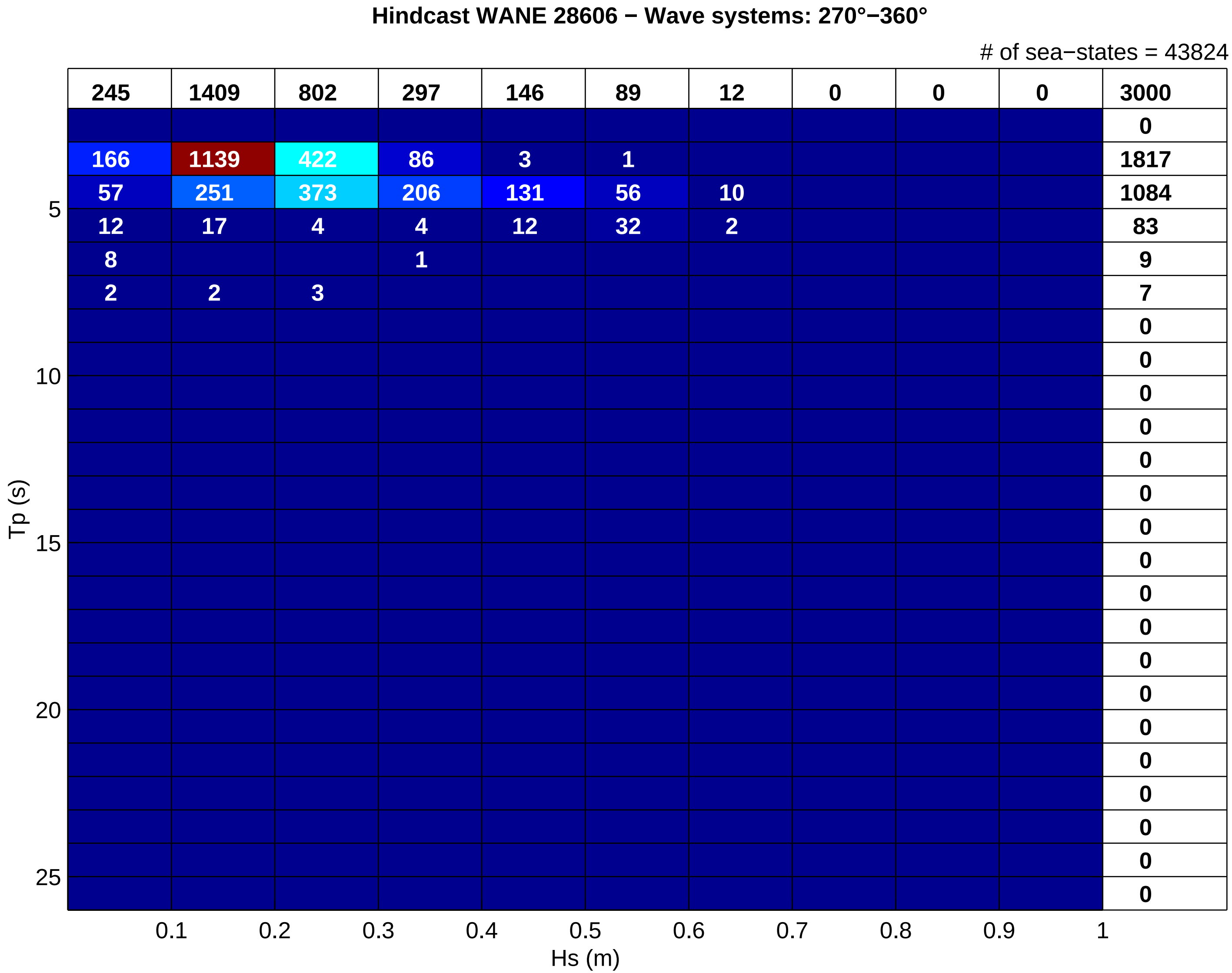

Hindcast WANE 27088 − Wave systems
# of sea−states = 43824
50258 39811 21241 4442 637 83 23 0 0 0 116495
0
539 4 543
614 1620 13 2247
489 2615 81 3185
632 8108 772 9512
945 6884 5257 3 13089
1466 2688 8456 1019 2 13631
2392 1367 2019 1388 67 7233
3914 2265 896 834 158 8 8075
5108 2987 802 367 166 23 9453
4897 2677 724 174 74 18 3 8567
4260 2447 582 170 35 10 2 7506
5498 2641 731 207 57 8 7 9149
4951 1531 450 154 41 6 5 7138
3732 768 169 50 10 2 2 4733
3410 671 169 45 19 4 4 4322
2221 280 67 15 7 2 2592
1980 140 37 5 2 2164
1078 75 10 6 1 1170
1012 20 2 3 1037
456 16 2 2 476
324 3 2 329
40 1 41
300 3 303
5
10
15
20
25
Tp (s)
0 0.5 1 1.5 2 2.5 3 3.5 4 4.5 5
Hs (m)

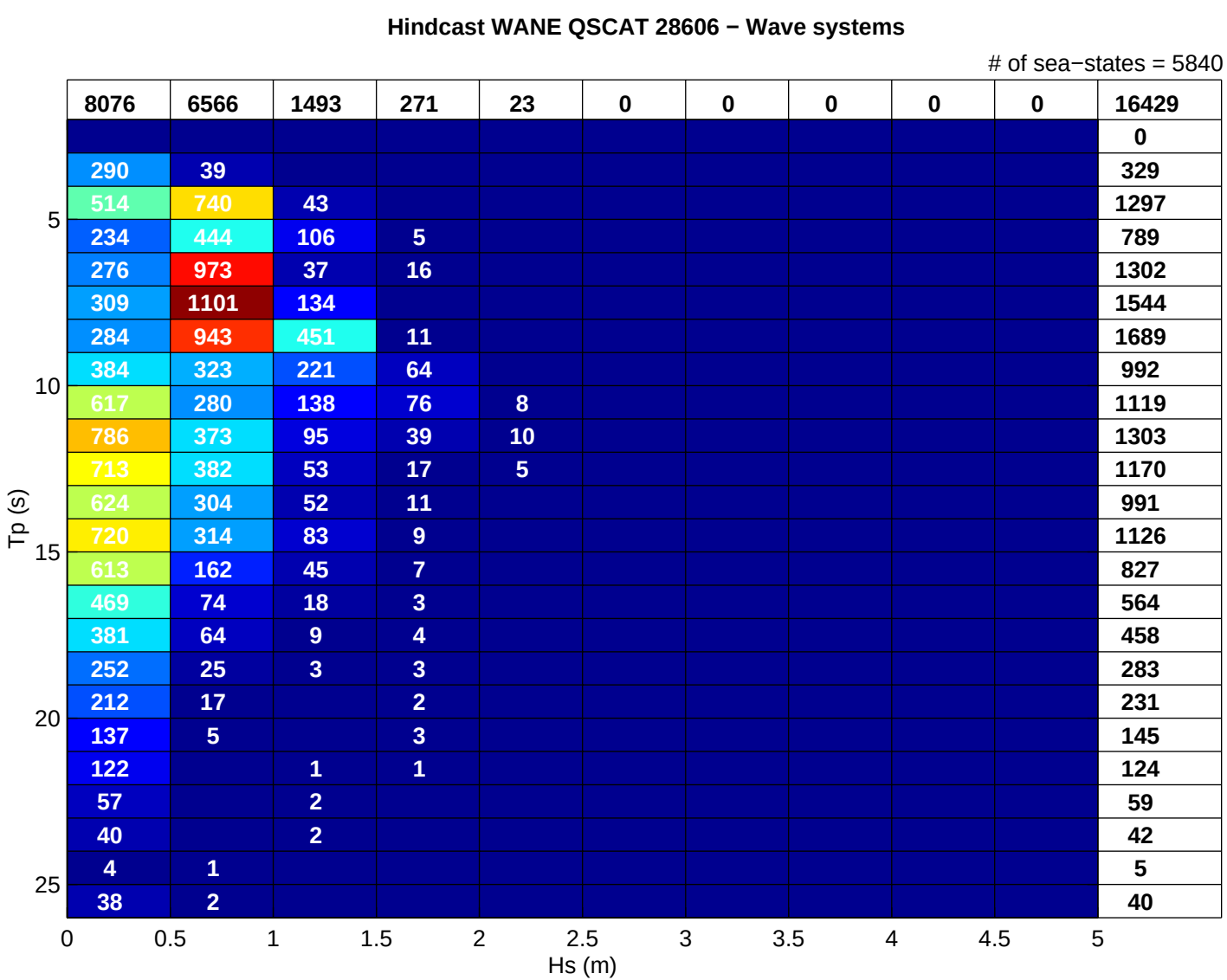

Hindcast WANE 27088 − Wave systems: 270°−360°
# of sea−states = 43824
610 260 108 74 54 33 12 6 0 0 1157
0
4 132 66 42 1 245
4 30 14 27 44 17 7 143
2 11 10 4 9 14 2 52
1 4 1 2 3 6 17
0
0
0
3 4 7
26 5 31
72 13 85
135 16 2 153
71 13 8 92
175 12 7 194
81 12 1 94
10 8 18
19 19
1 1
6 6
0
0
0
0
0
5
10
15
20
25
Tp (s)
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1
Hs (m)

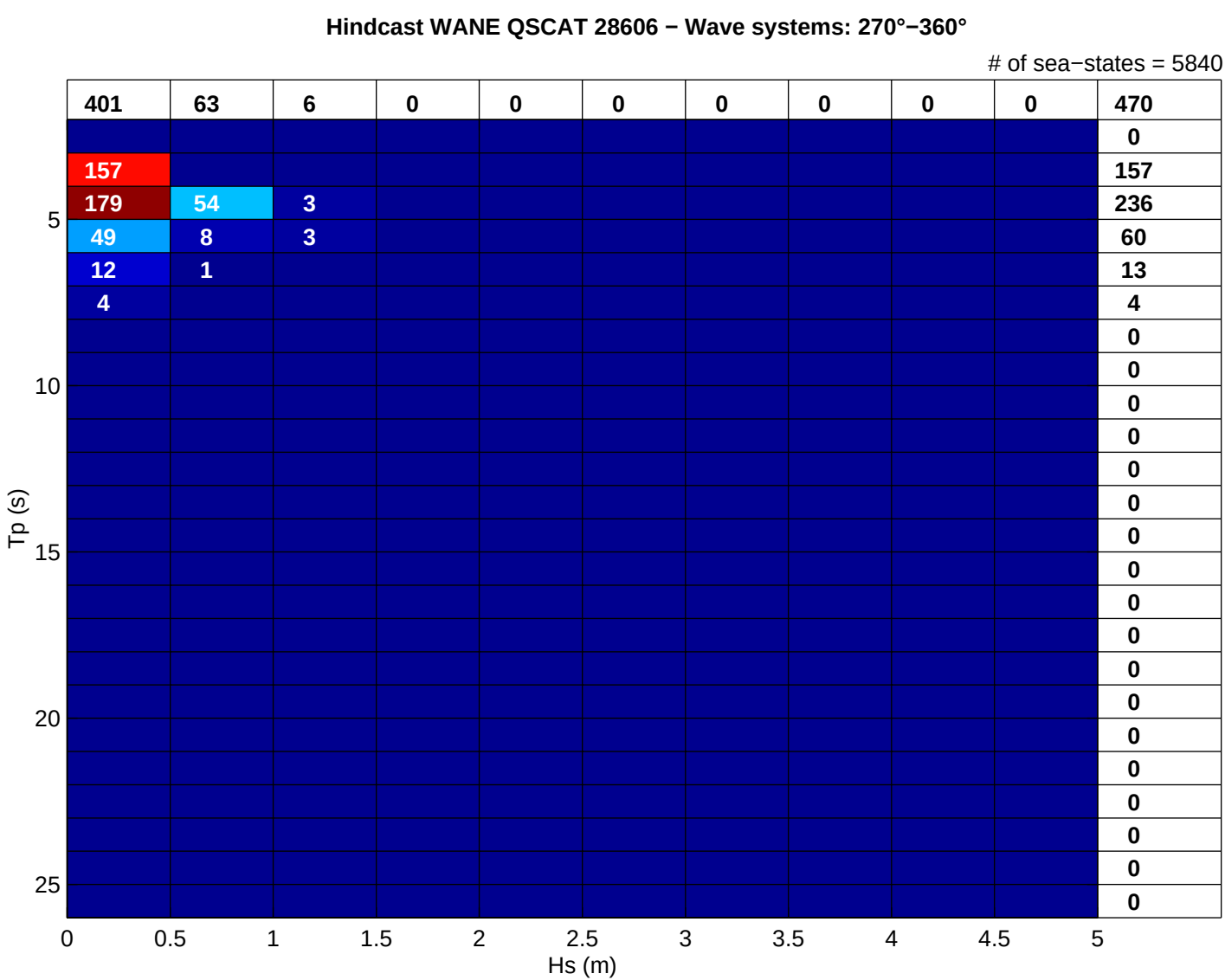

Hindcast WANE QSCAT 27088 − Wave systems
# of sea−states = 5840
6562 4856 3136 584 139 13 0 0 0 0 15290
0
113 1 114
67 208 2 277
61 317 29 407
50 973 180 1203
89 870 938 2 1899
199 318 1172 213 3 1905
330 164 284 174 53 1005
560 267 108 84 41 13 1073
793 385 94 39 36 1347
712 374 74 18 6 1184
627 311 55 14 1007
711 327 102 10 1150
602 157 51 12 822
469 65 23 5 562
357 66 15 5 443
247 24 4 2 277
199 21 2 222
121 5 3 129
122 1 1 124
59 2 61
36 2 38
3 3
35 3 38
5
10
15
20
25
Tp (s)
0 0.5 1 1.5 2 2.5 3 3.5 4 4.5 5
Hs (m)

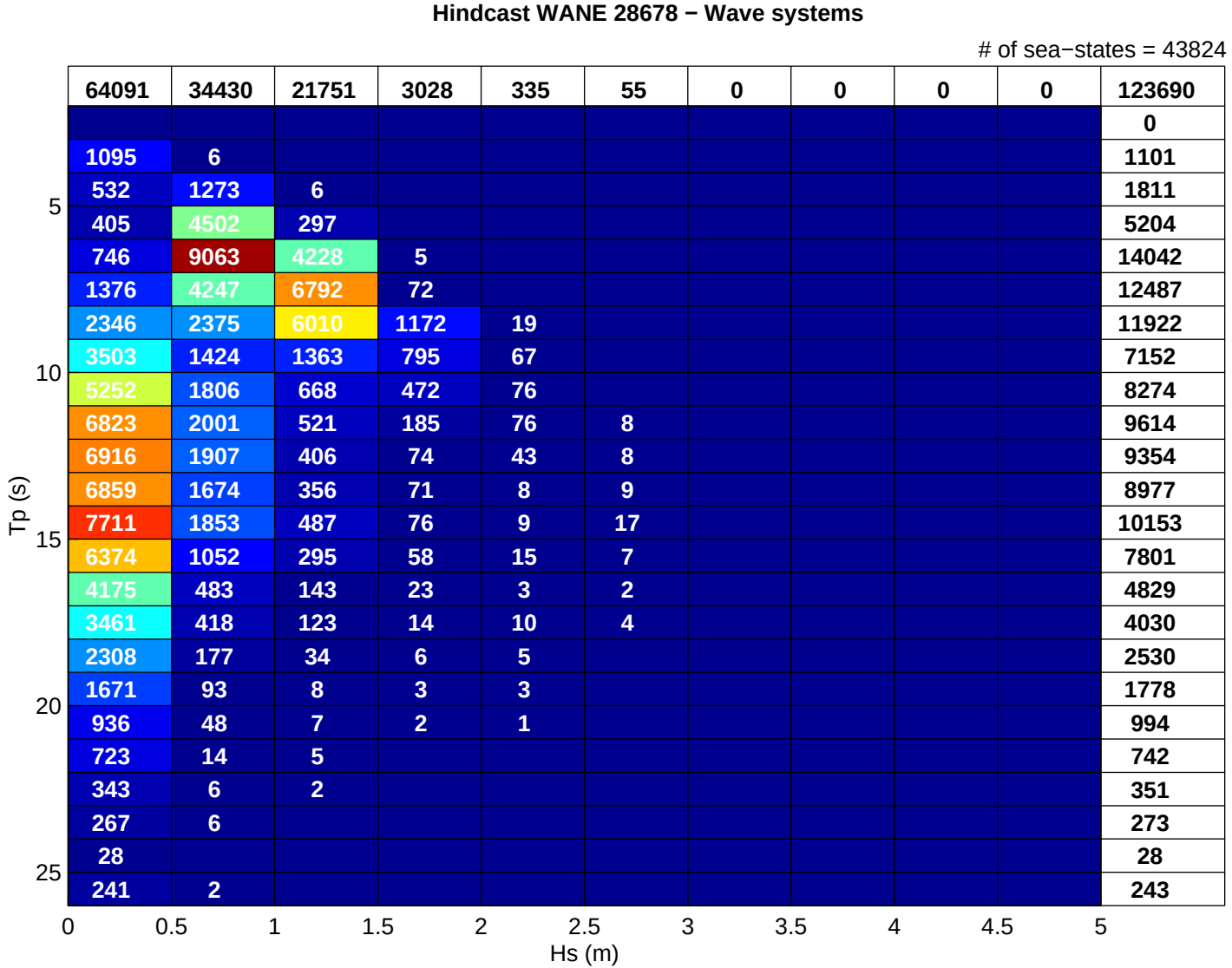

Hindcast WANE QSCAT 27088 − Wave systems: 270°−360°
# of sea−states = 5840
82 29 38 16 10 7 8 1 0 0 191
0
3 18 23 7 1 52
6 2 6 8 9 7 8 1 47
4 6 3 1 14
1 3 6 10
0
0
0
0
6 6
8 8
14 14
18 18
10 10
12 12
0
0
0
0
0
0
0
0
0
5
10
15
20
25
Tp (s)
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1
Hs (m)

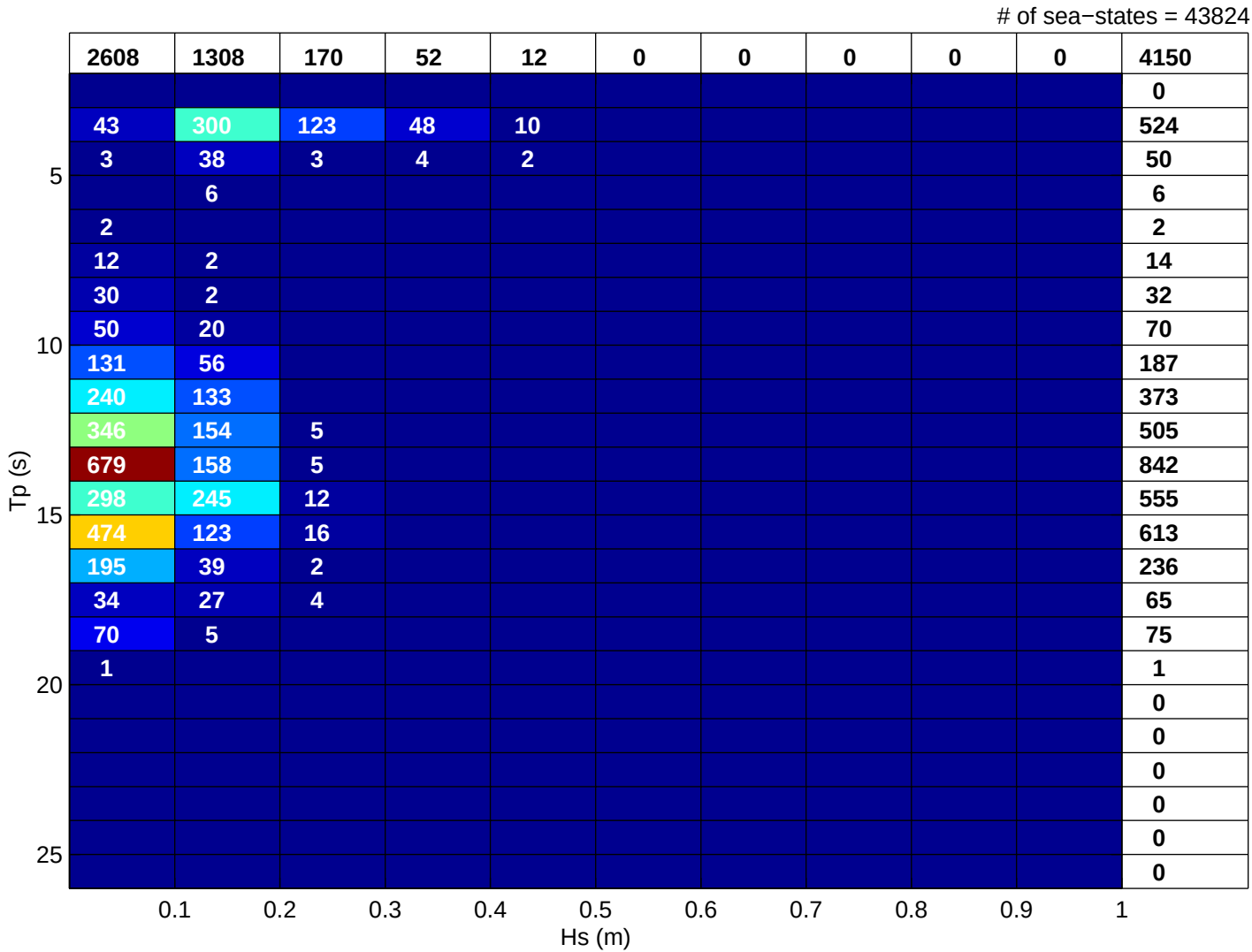

Hindcast WANE 28606 − Wave systems
# of sea−states = 43824
71176 45383 8334 1310 214 29 6 0 0 0 126452
0
3509 11 3520
5145 1735 6880
3190 2812 4 6006
3867 6891 3 10761
4095 7862 229 12186
3588 6764 2101 8 12461
2985 2717 1459 149 3 7313
4410 2628 1069 246 18 8371
5394 2836 886 205 39 9360
5076 2616 651 149 32 7 8531
4307 2361 521 133 33 4 7359
5657 2615 627 191 26 3 3 9122
4894 1554 375 123 32 4 3 6985
3848 774 159 40 11 4 4836
3563 678 157 34 17 6 4455
2242 271 59 17 2 1 2592
2084 136 24 7 1 2252
1079 76 6 5 1166
1052 26 3 1081
450 16 2 468
379 1 2 382
41 1 42
321 2 323
5
10
15
20
25
Tp (s)
0 0.5 1 1.5 2 2.5 3 3.5 4 4.5 5
Hs (m)

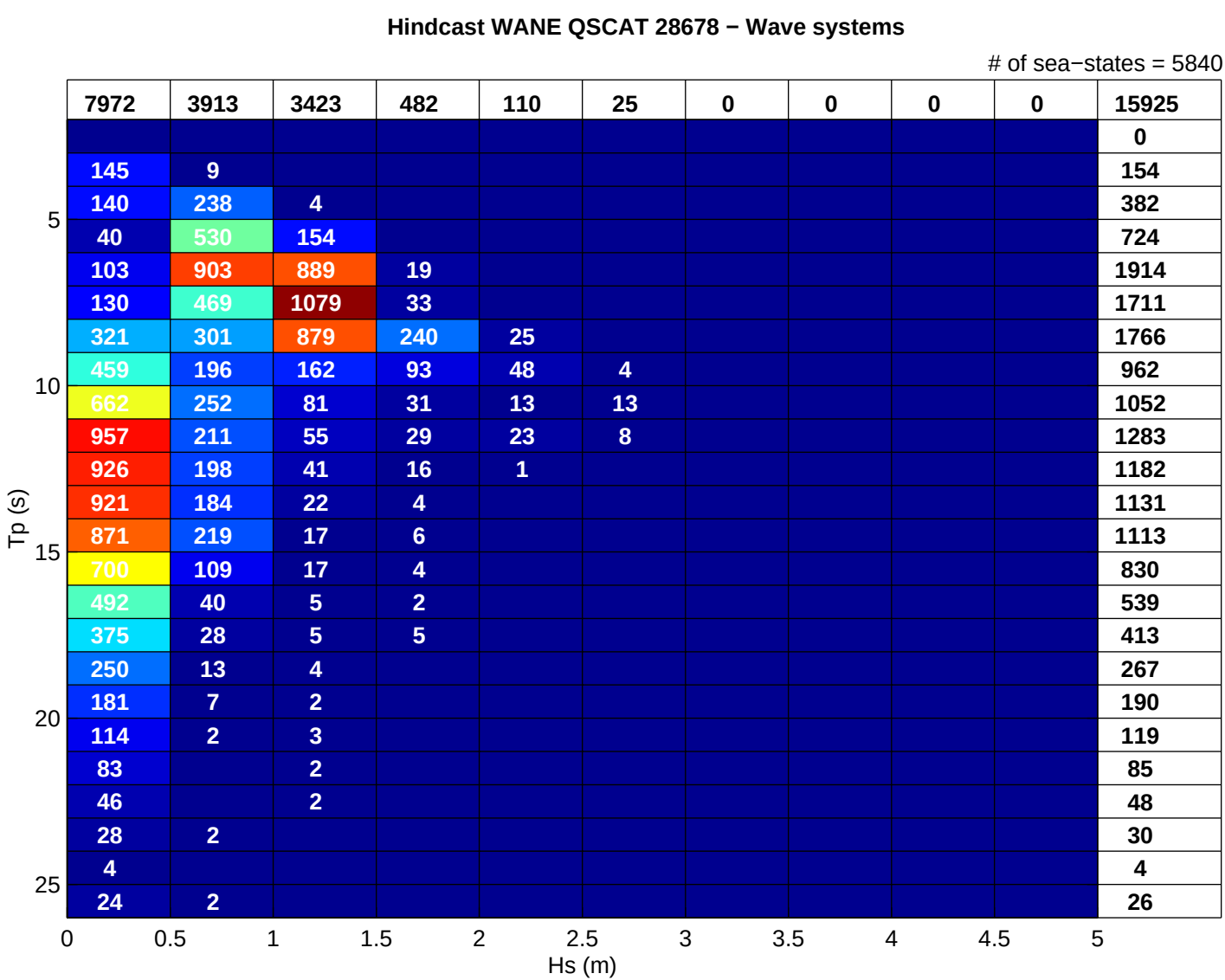

Hindcast WANE 28606 − Wave systems: 270°−360°
# of sea−states = 43824
245
1409
802
297
146
89
12
0
0
0
3000
0
166
1139
422
86
3
1
1817
57
251
373
206
131
56
10
1084
12
17
4
4
12
32
2
83
8
1
9
2
2
3
7
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
5
10
15
20
25
Tp (s)
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
Hs (m)

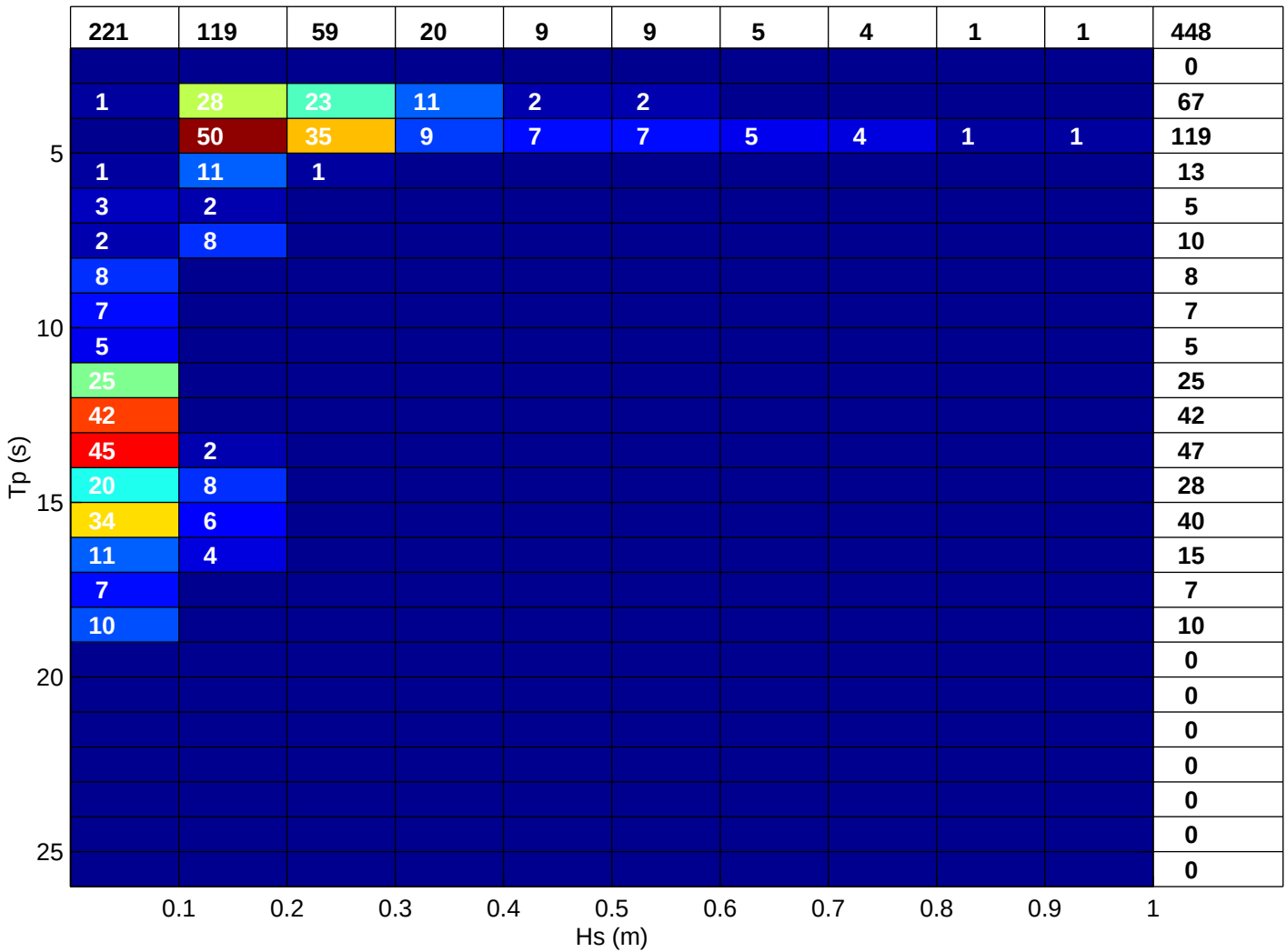

Hindcast WANE QSCAT 28606 − Wave systems
# of sea−states = 5840
8076 6566 1493 271 23 0 0 0 0 0 16429
0
290 39 329
514 740 43 1297
234 444 106 5 789
276 973 37 16 1302
309 1101 134 1544
284 943 451 11 1689
384 323 221 64 992
617 280 138 76 8 1119
786 373 95 39 10 1303
713 382 53 17 5 1170
624 304 52 11 991
720 314 83 9 1126
613 162 45 7 827
469 74 18 3 564
381 64 9 4 458
252 25 3 3 283
212 17 2 231
137 5 3 145
122 1 1 124
57 2 59
40 2 42
4 1 5
38 2 40
Tp (s)
5
10
15
20
25
0 0.5 1 1.5 2 2.5 3 3.5 4 4.5 5
Hs (m)

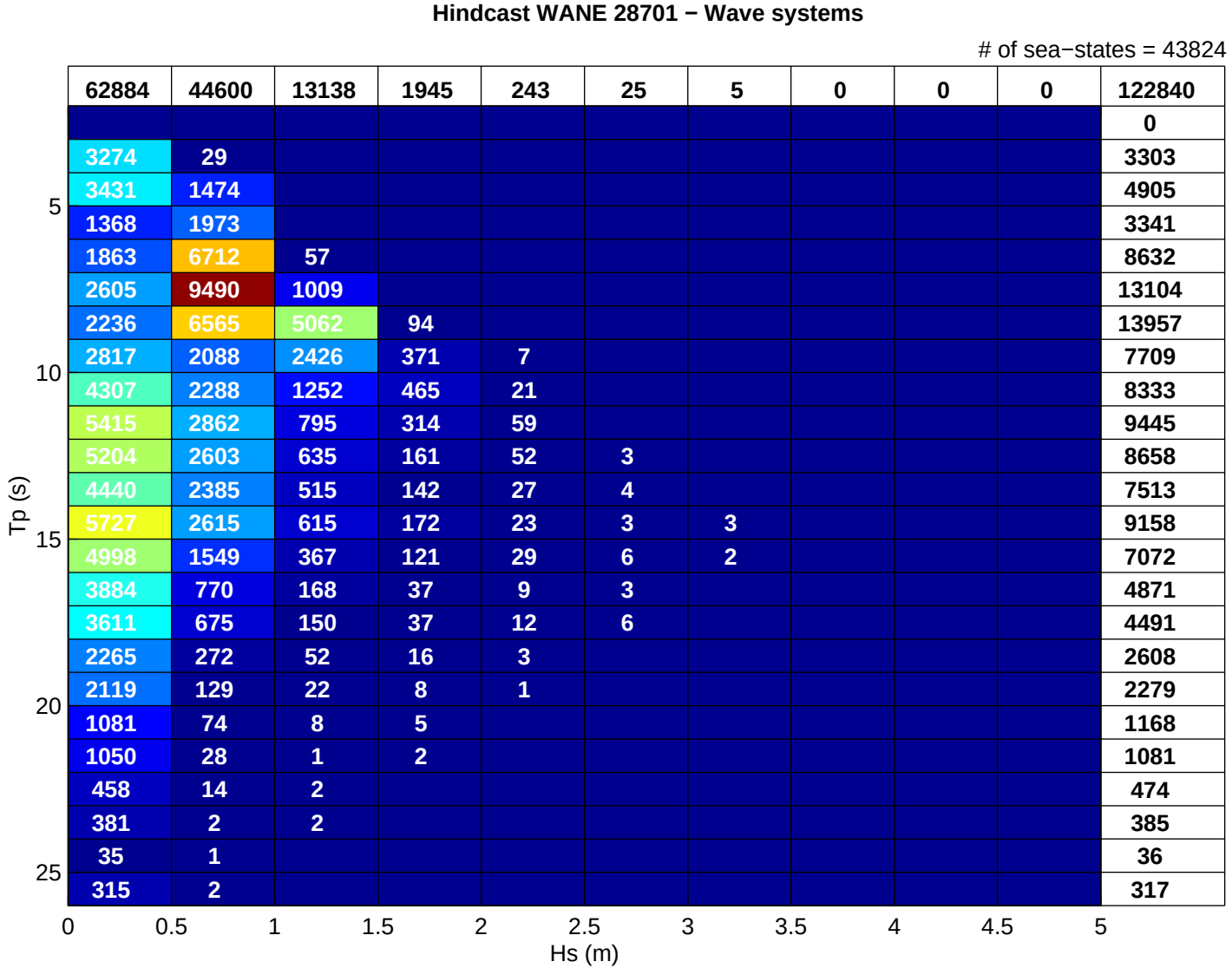

Hindcast WANE QSCAT 28606 − Wave systems: 270°−360°
# of sea−states = 5840
401 63 6 0 0 0 0 0 0 0 470
0
157 157
179 54 3 236
49 8 3 60
12 1 13
4 4
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
Tp (s)
5
10
15
20
25
0 0.5 1 1.5 2 2.5 3 3.5 4 4.5 5
Hs (m)


Hindcast WANE 28678 − Wave systems
# of sea−states = 43824
64091 34430 21751 3028 335 55 0 0 0 0 123690
0
1095 6 1101
532 1273 6 1811
405 4502 297 5204
746 9063 4228 5 14042
1376 4247 6792 72 12487
2346 2375 6010 1172 19 11922
3503 1424 1363 795 67 7152
5252 1806 668 472 76 8274
6823 2001 521 185 76 8 9614
6916 1907 406 74 43 8 9354
6859 1674 356 71 8 9 8977
7711 1853 487 76 9 17 10153
6374 1052 295 58 15 7 7801
4175 483 143 23 3 2 4829
3461 418 123 14 10 4 4030
2308 177 34 6 5 2530
1671 93 8 3 3 1778
936 48 7 2 1 994
723 14 5 742
343 6 2 351
267 6 273
28 28
241 2 243
5
10
15
20
25
Tp (s)
0 0.5 1 1.5 2 2.5 3 3.5 4 4.5 5
Hs (m)

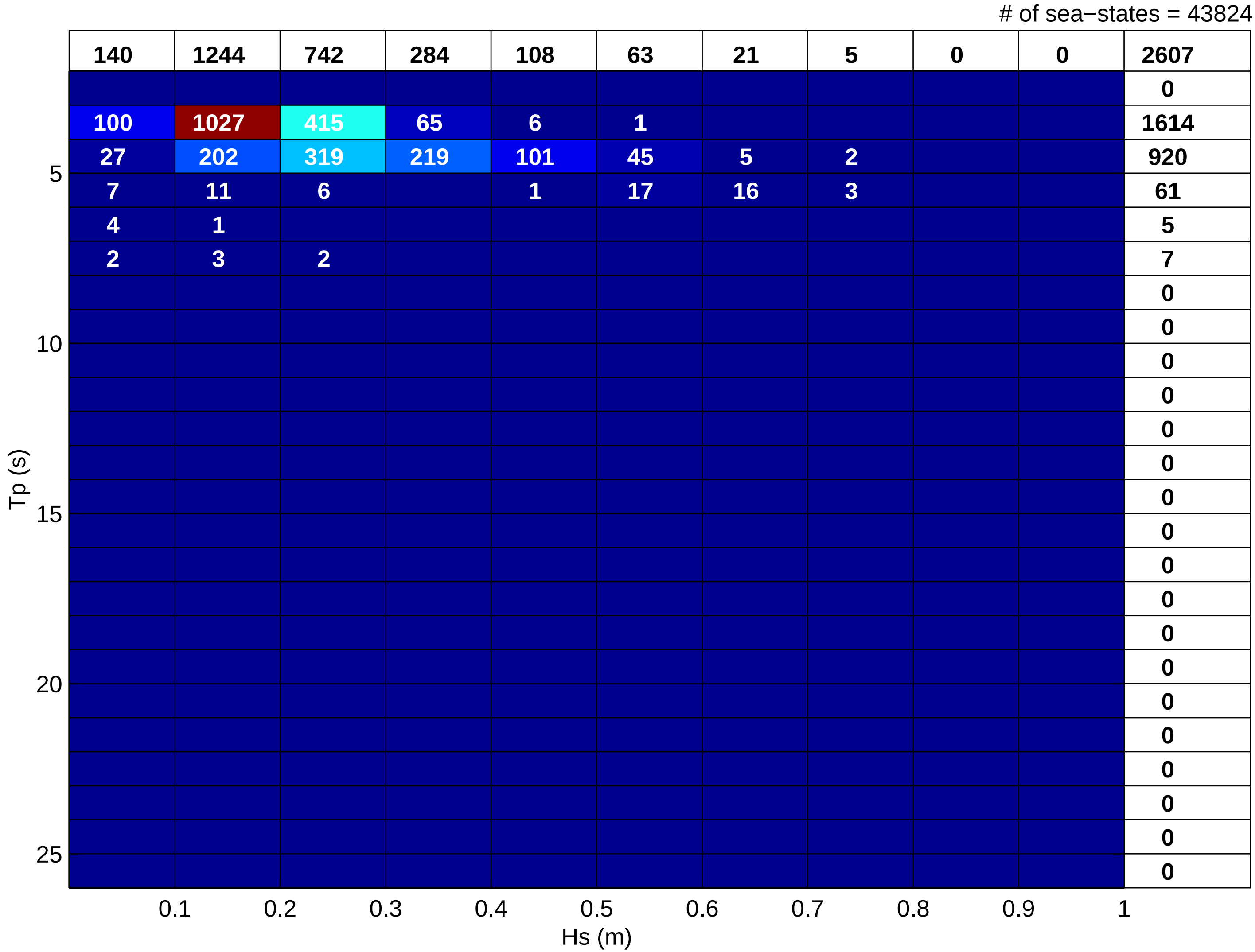

Hindcast WANE 28678 − Wave systems: 270°−360°
# of sea−states = 43824
2608 1308 170 52 12 0 0 0 0 0 4150
0
43 300 123 48 10 524
3 38 3 4 2 50
6 6
2 2
12 2 14
30 2 32
50 20 70
131 56 187
240 133 373
346 154 5 505
679 158 5 842
298 245 12 555
474 123 16 613
195 39 2 236
34 27 4 65
70 5 75
1 1
0
0
0
0
0
0
5
10
15
20
25
Tp (s)
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1
Hs (m)

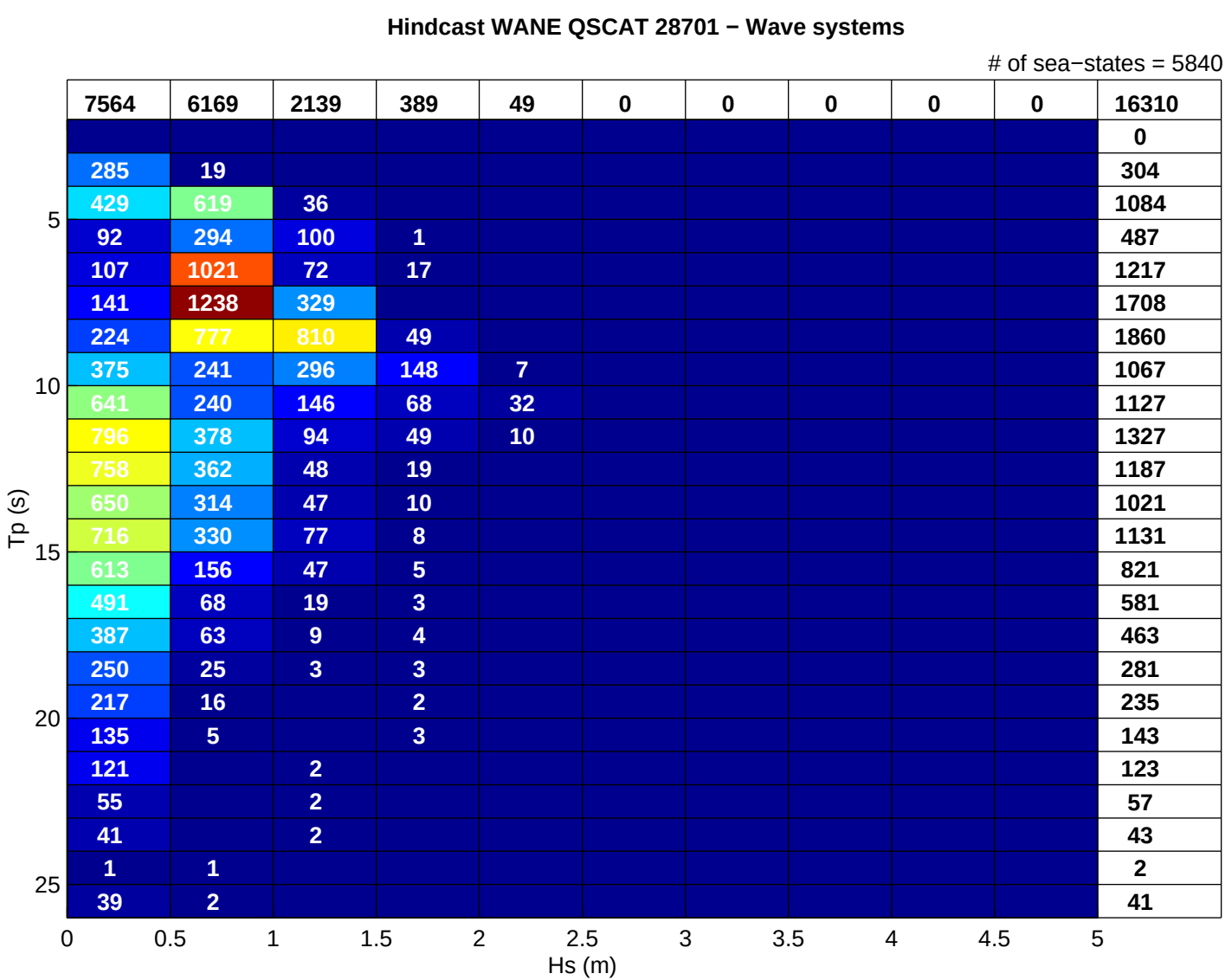

Hindcast WANE QSCAT 28678 − Wave systems
# of sea−states = 5840
7972 3913 3423 482 110 25 0 0 0 0 15925
0
145 9 154
140 238 4 382
40 530 154 724
103 903 889 19 1914
130 469 1079 33 1711
321 301 879 240 25 1766
459 196 162 93 48 4 962
662 252 81 31 13 13 1052
957 211 55 29 23 8 1283
926 198 41 16 1 1182
921 184 22 4 1131
871 219 17 6 1113
700 109 17 4 830
492 40 5 2 539
375 28 5 5 413
250 13 4 267
181 7 2 190
114 2 3 119
83 2 85
46 2 48
28 2 30
4 4
24 2 26
Tp (s)
5
10
15
20
25
0 0.5 1 1.5 2 2.5 3 3.5 4 4.5 5
Hs (m)

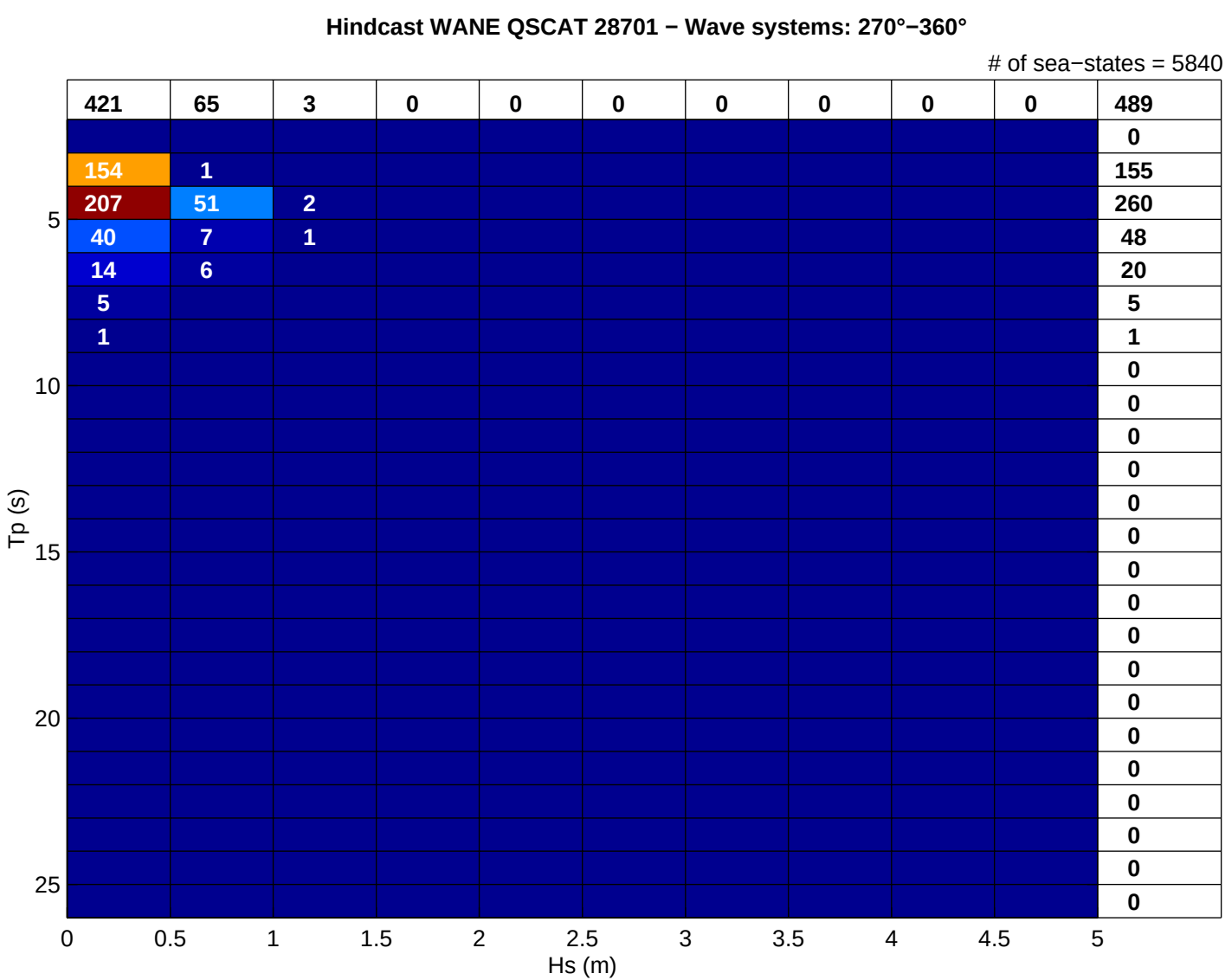

Hindcast WANE QSCAT 28678 − Wave systems: 270°−360°
# of sea−states = 5840
221 119 59 20 9 9 5 4 1 1 448
0
1 28 23 11 2 2 67
50 35 9 7 7 5 4 1 1 119
1 11 1 13
3 2 5
2 8 10
8 8
7 7
5 5
25 25
42 42
45 2 47
20 8 28
34 6 40
11 4 15
7 7
10 10
0
0
0
0
0
0
0
5
10
15
20
25
Tp (s)
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1
Hs (m)

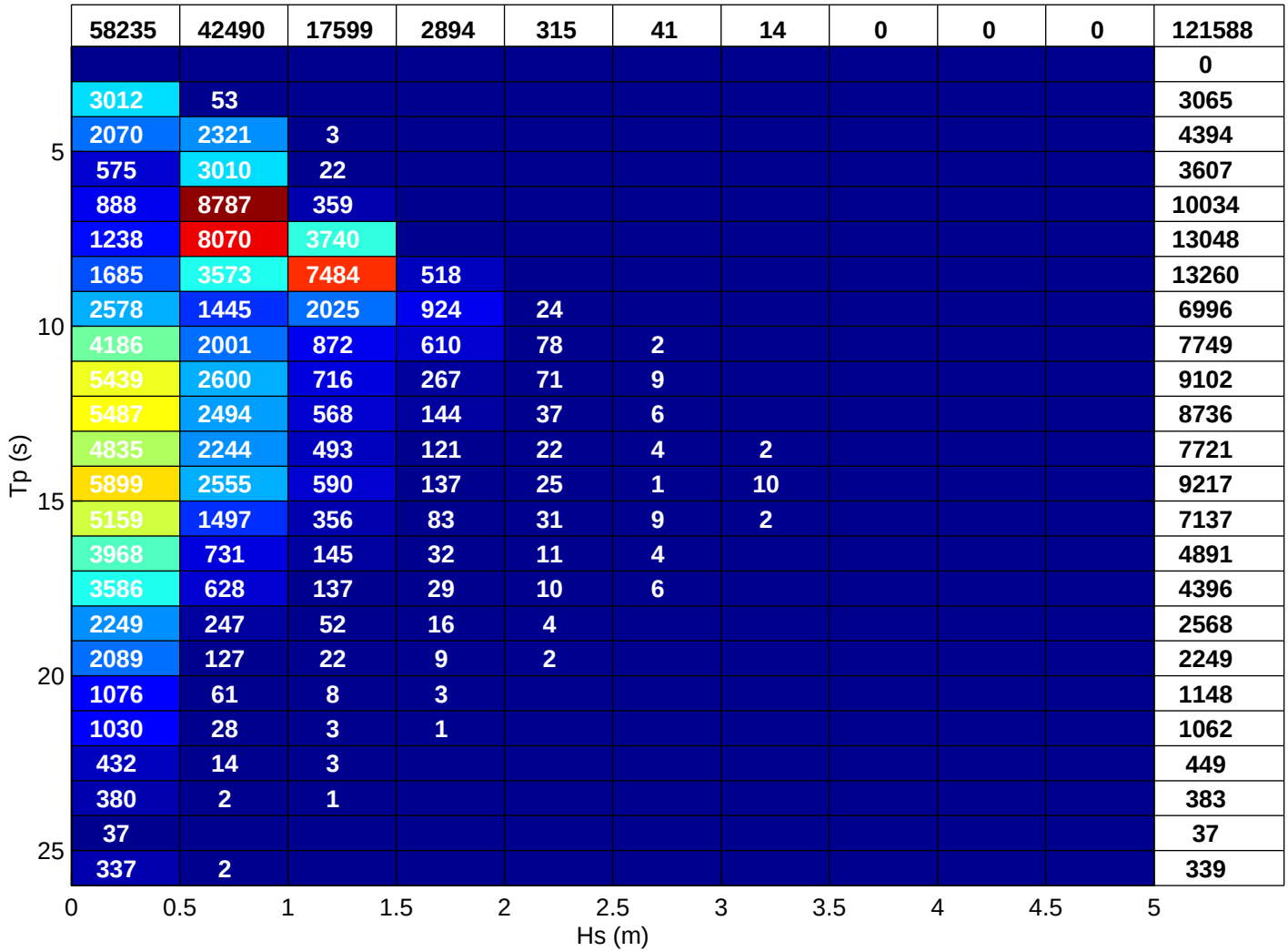

Hindcast WANE 28701 − Wave systems
# of sea−states = 43824
62884 44600 13138 1945 243 25 5 0 0 0 122840
0
3274 29 3303
3431 1474 4905
1368 1973 3341
1863 6712 57 8632
2605 9490 1009 13104
2236 6565 5062 94 13957
2817 2088 2426 371 7 7709
4307 2288 1252 465 21 8333
5415 2862 795 314 59 9445
5204 2603 635 161 52 3 8658
4440 2385 515 142 27 4 7513
5727 2615 615 172 23 3 3 9158
4998 1549 367 121 29 6 2 7072
3884 770 168 37 9 3 4871
3611 675 150 37 12 6 4491
2265 272 52 16 3 2608
2119 129 22 8 1 2279
1081 74 8 5 1168
1050 28 1 2 1081
458 14 2 474
381 2 2 385
35 1 36
315 2 317
5
10
15
20
25
Tp (s)
0 0.5 1 1.5 2 2.5 3 3.5 4 4.5 5
Hs (m)

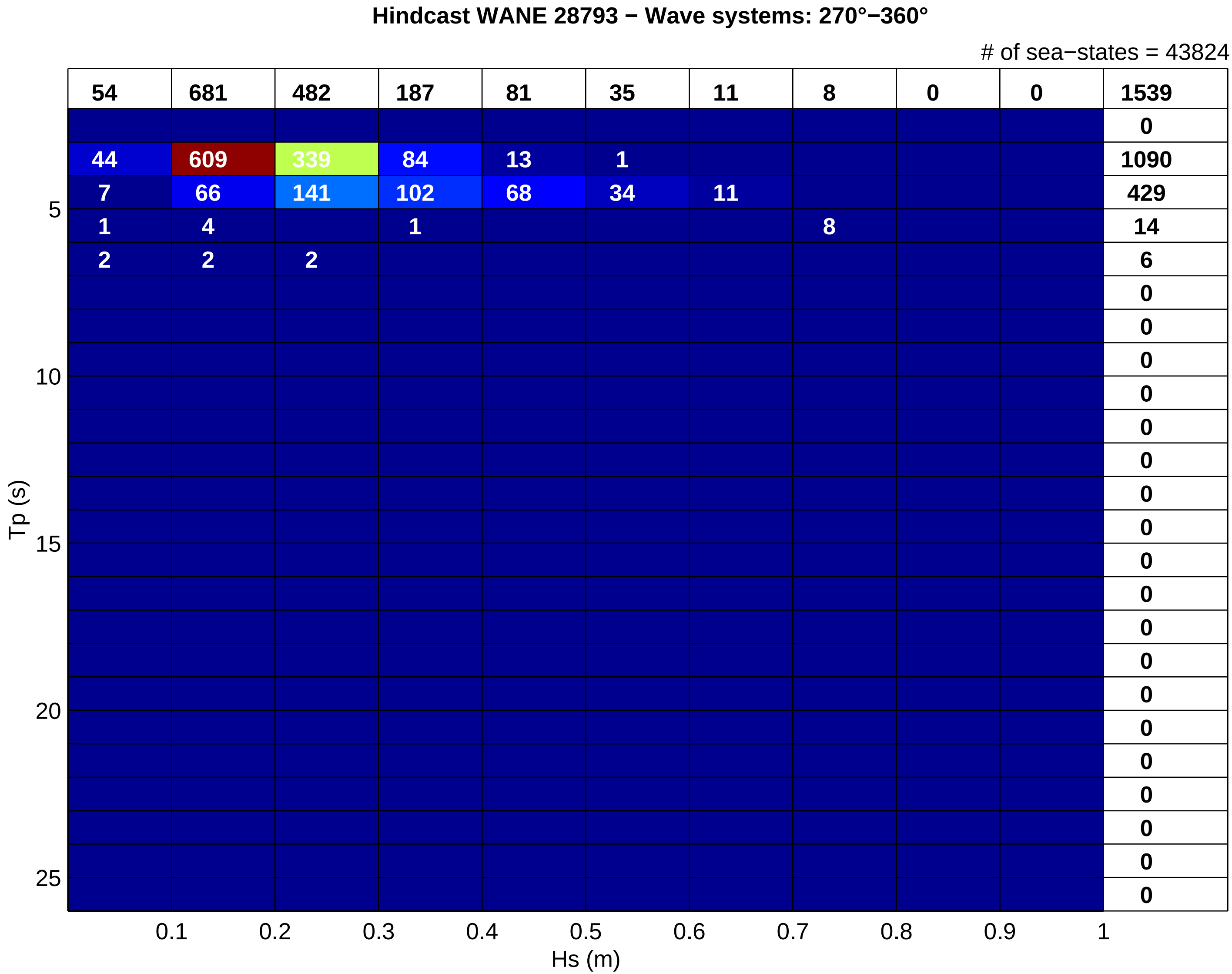
Hindcast WANE 28701 − Wave systems: 270°−360°

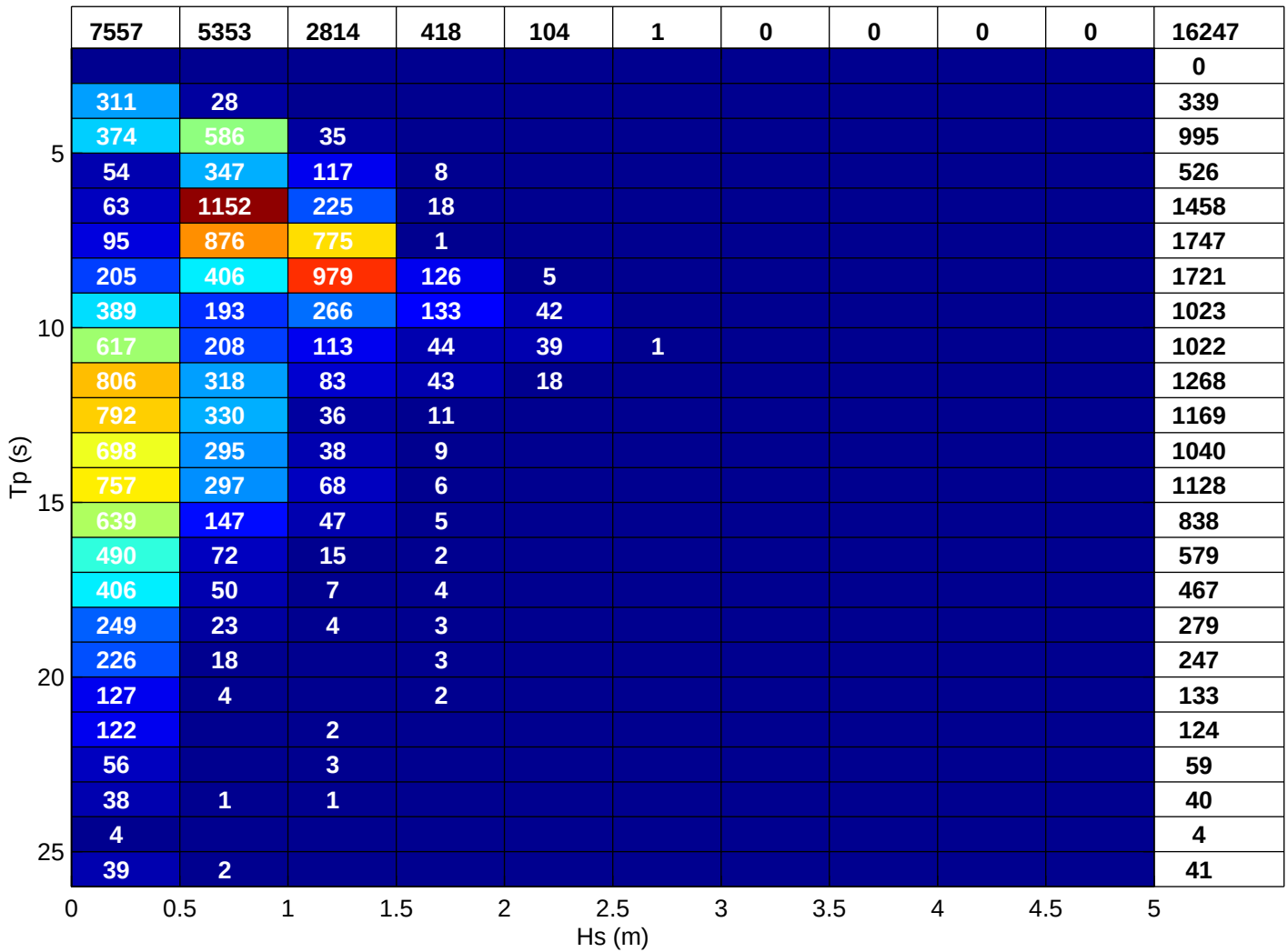


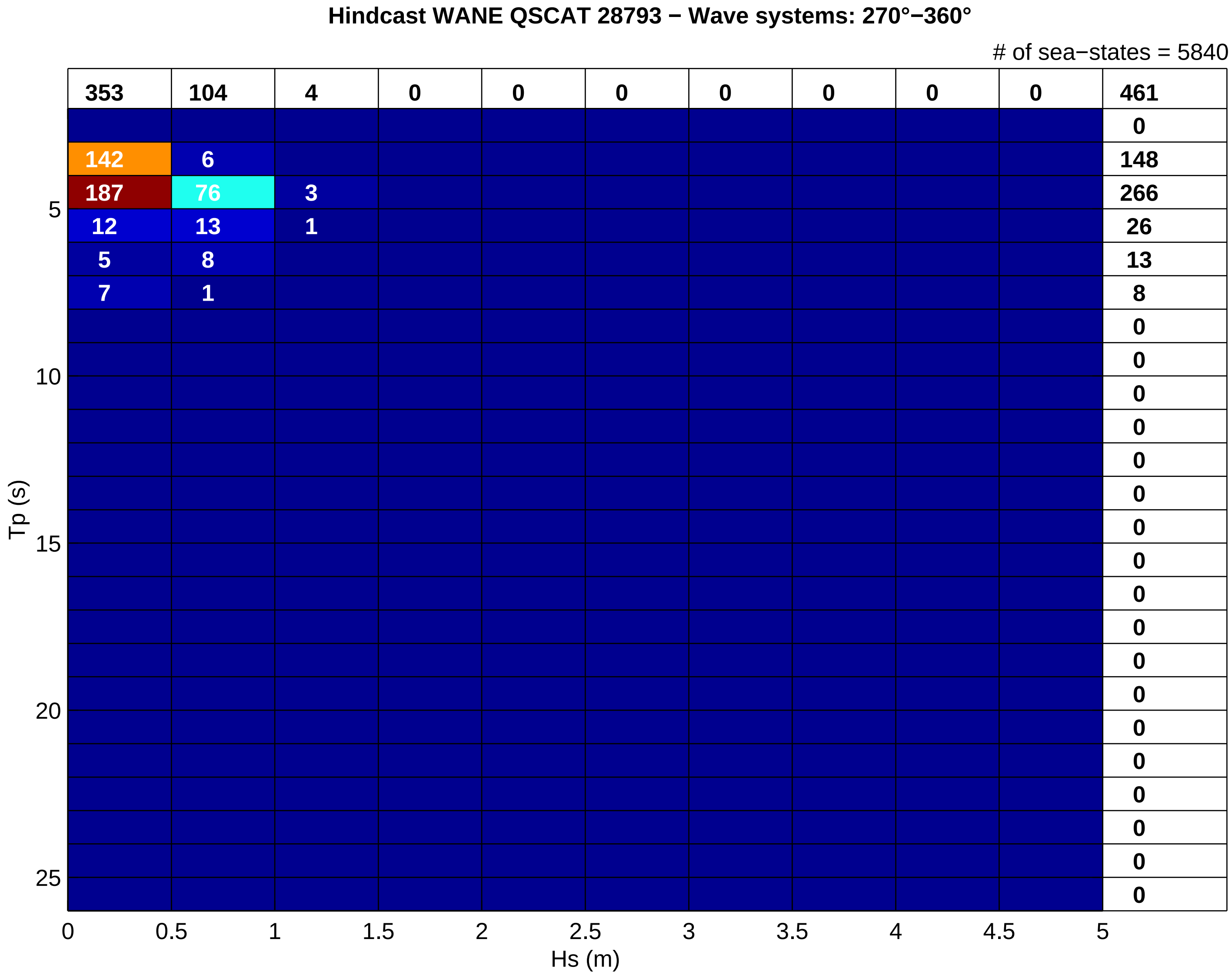

Hindcast WANE QSCAT 28701 − Wave systems
# of sea−states = 5840
7564 6169 2139 389 49 0 0 0 0 0 16310
0
285 19 304
429 619 36 1084
92 294 100 1 487
107 1021 72 17 1217
141 1238 329 1708
224 777 810 49 1860
375 241 296 148 7 1067
641 240 146 68 32 1127
796 378 94 49 10 1327
758 362 48 19 1187
650 314 47 10 1021
716 330 77 8 1131
613 156 47 5 821
491 68 19 3 581
387 63 9 4 463
250 25 3 3 281
217 16 2 235
135 5 3 143
121 2 123
55 2 57
41 2 43
1 1 2
39 2 41
5
10
15
20
25
Tp (s)
0 0.5 1 1.5 2 2.5 3 3.5 4 4.5 5
Hs (m)

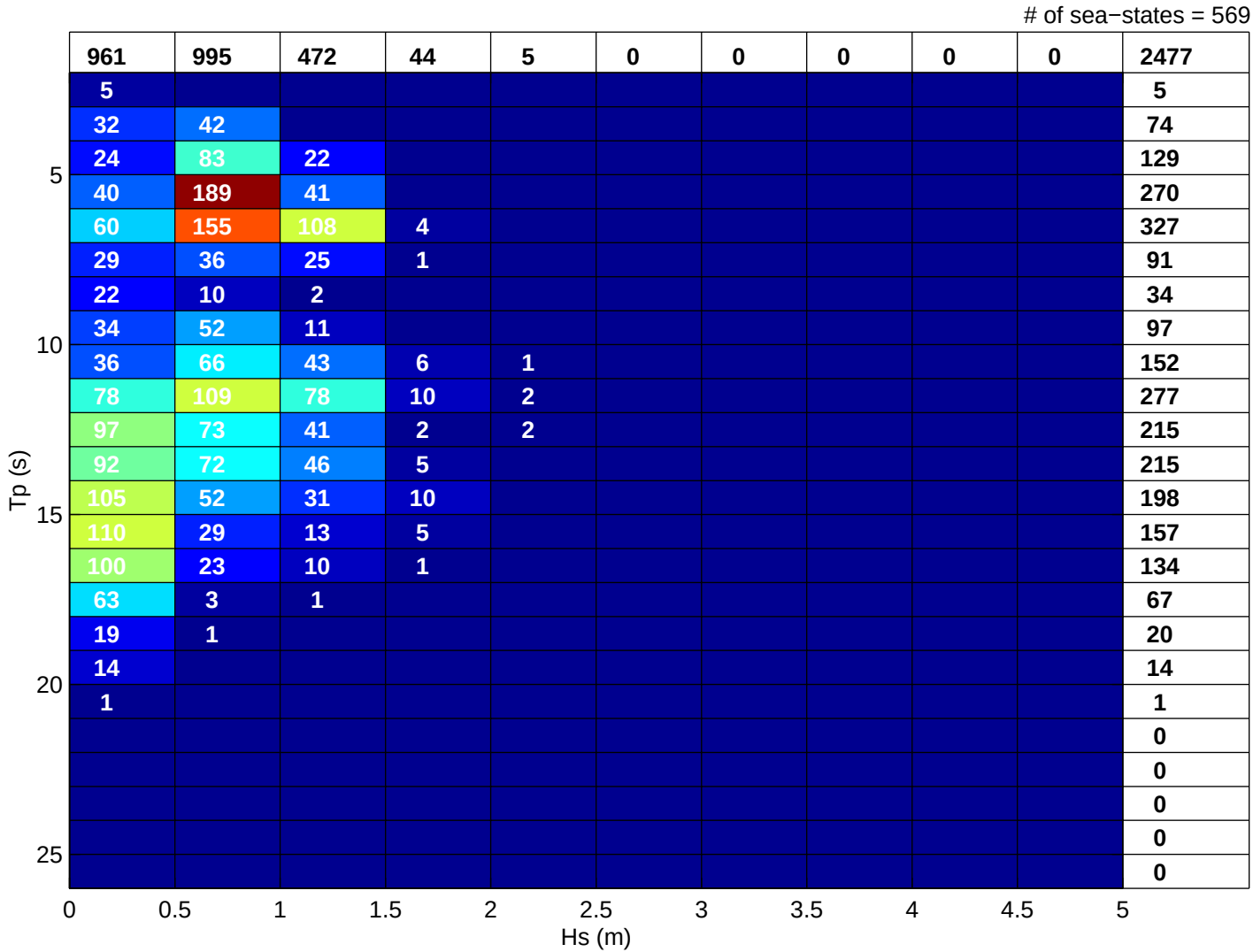

Hindcast WANE QSCAT 28701 − Wave systems: 270°−360°
# of sea−states = 5840
421 65 3 0 0 0 0 0 0 0 489
0
154 1 155
207 51 2 260
40 7 1 48
14 6 20
5 5
1 1
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
5
10
15
20
25
Tp (s)
0 0.5 1 1.5 2 2.5 3 3.5 4 4.5 5
Hs (m)

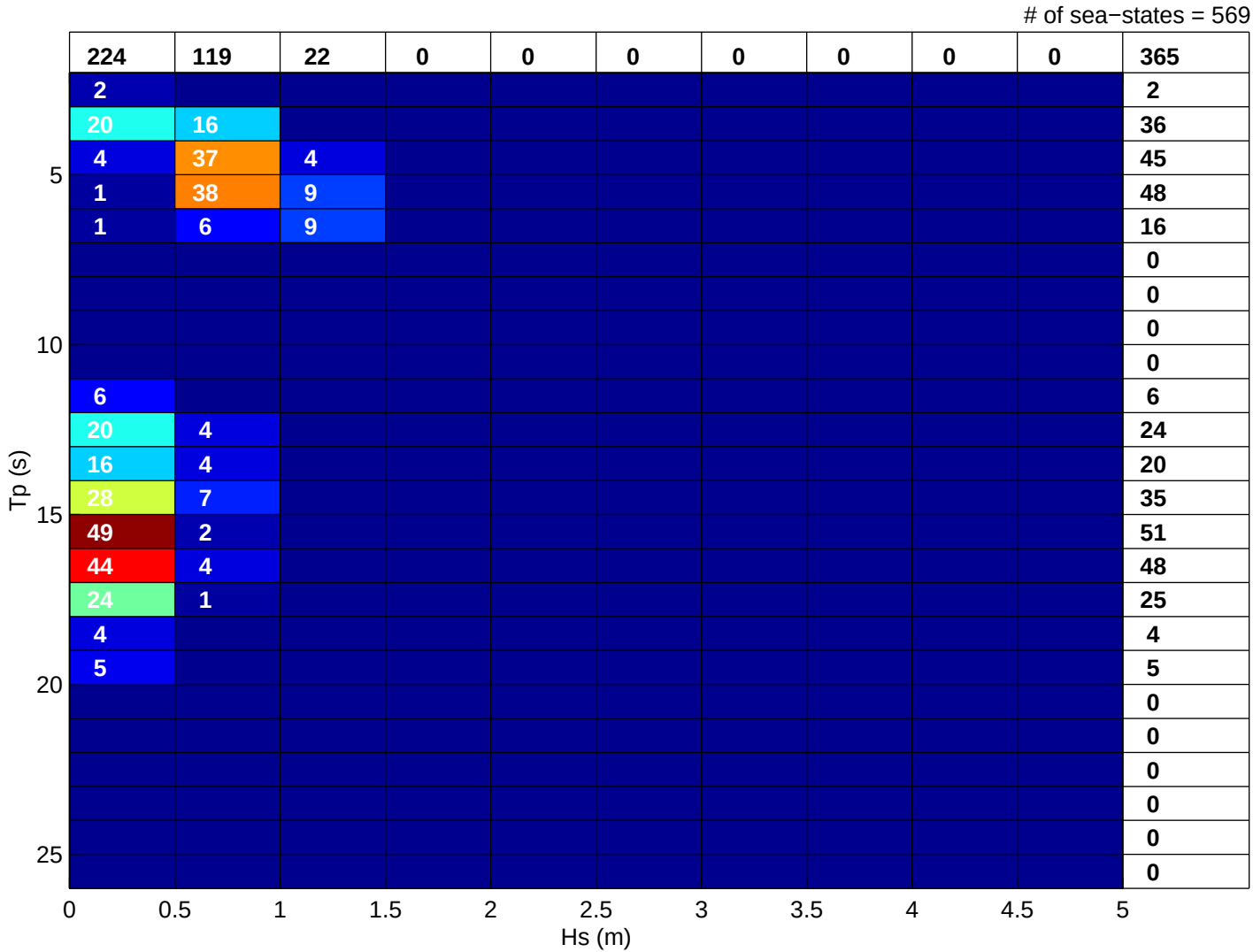

Hindcast WANE 28793 − Wave systems
# of sea−states = 43824
58235 42490 17599 2894 315 41 14 0 0 0 121588
0
3012 53 3065
2070 2321 3 4394
575 3010 22 3607
888 8787 359 10034
1238 8070 3740 13048
1685 3573 7484 518 13260
2578 1445 2025 924 24 6996
4186 2001 872 610 78 2 7749
5439 2600 716 267 71 9 9102
5487 2494 568 144 37 6 8736
4835 2244 493 121 22 4 2 7721
5899 2555 590 137 25 1 10 9217
5159 1497 356 83 31 9 2 7137
3968 731 145 32 11 4 4891
3586 628 137 29 10 6 4396
2249 247 52 16 4 2568
2089 127 22 9 2 2249
1076 61 8 3 1148
1030 28 3 1 1062
432 14 3 449
380 2 1 383
37 37
337 2 339
5
10
15
20
25
Tp (s)
0 0.5 1 1.5 2 2.5 3 3.5 4 4.5 5
Hs (m)

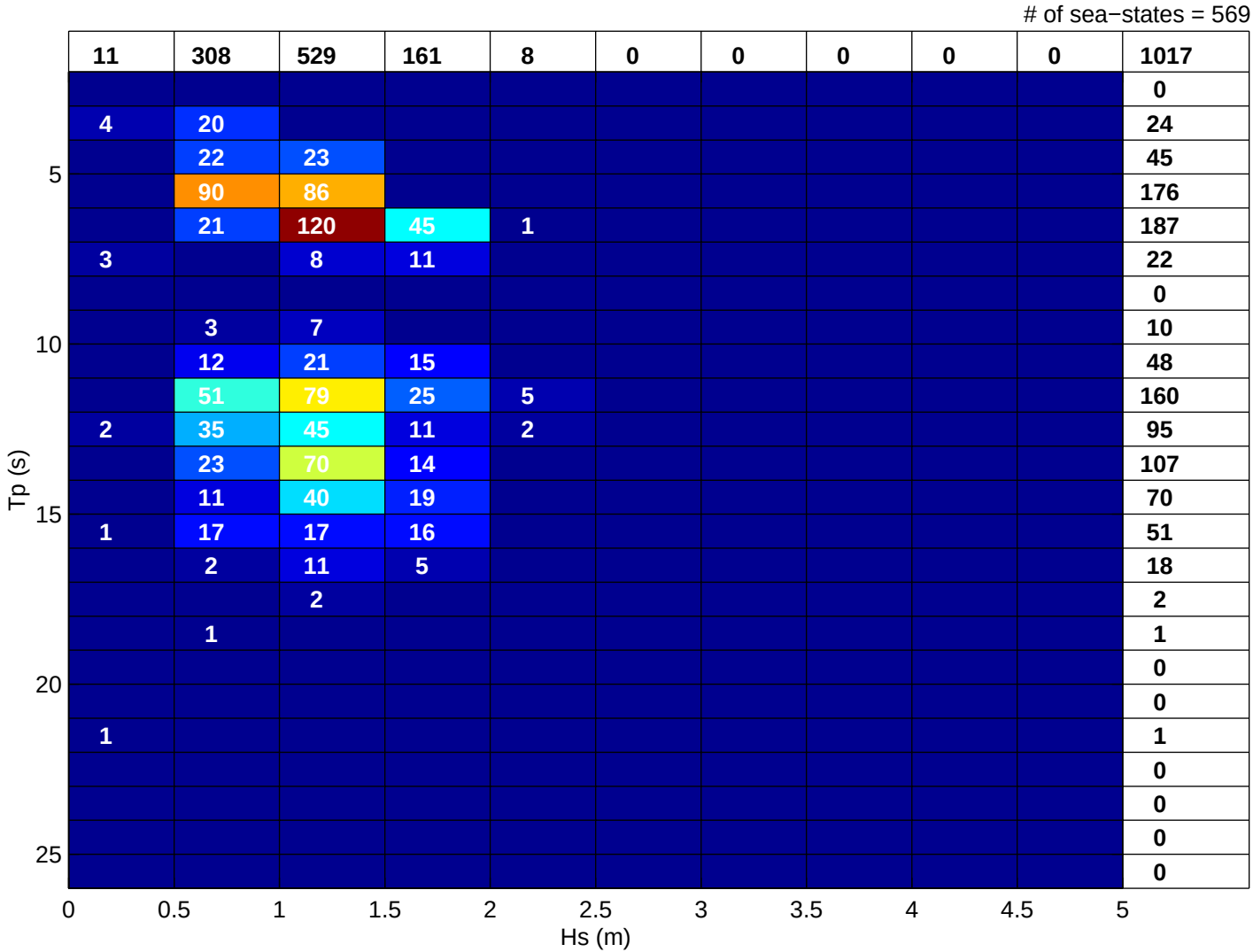

Hindcast WANE 28793 − Wave systems: 270°−360°
# of sea−states = 43824
54
681
482
187
81
35
11
8
0
0
1539
0
44
609
339
84
13
1
1090
7
66
141
102
68
34
11
429
1
4
1
8
14
2
2
2
6
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
5
10
15
20
25
Tp (s)
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
Hs (m)

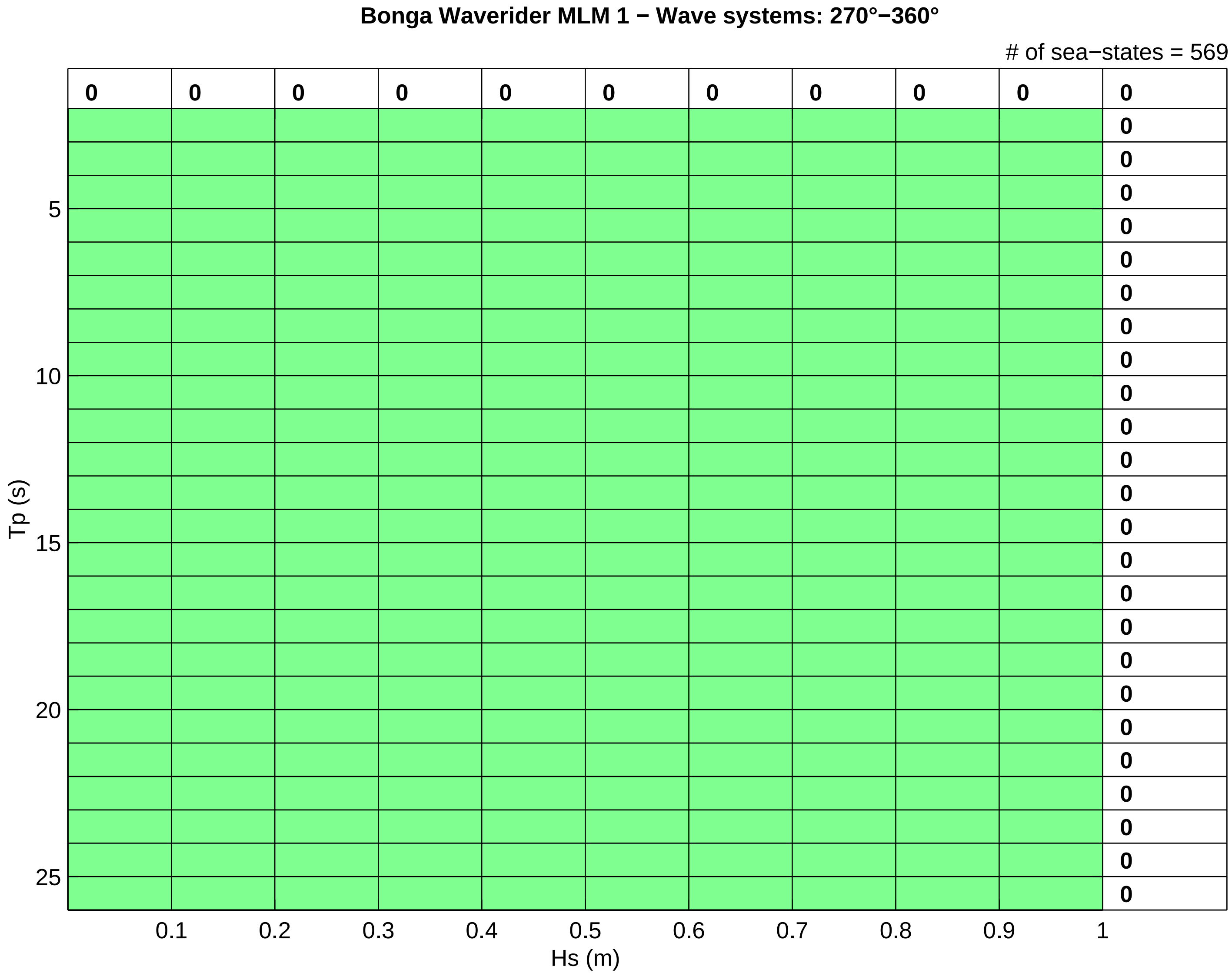

Hindcast WANE QSCAT 28793 − Wave systems
# of sea−states = 5840
7557 5353 2814 418 104 1 0 0 0 0 16247
0
311 28 339
374 586 35 995
54 347 117 8 526
63 1152 225 18 1458
95 876 775 1 1747
205 406 979 126 5 1721
389 193 266 133 42 1023
617 208 113 44 39 1 1022
806 318 83 43 18 1268
792 330 36 11 1169
698 295 38 9 1040
757 297 68 6 1128
639 147 47 5 838
490 72 15 2 579
406 50 7 4 467
249 23 4 3 279
226 18 3 247
127 4 2 133
122 2 124
56 3 59
38 1 1 40
4 4
39 2 41
5
10
15
20
25
Tp (s)
0 0.5 1 1.5 2 2.5 3 3.5 4 4.5 5
Hs (m)

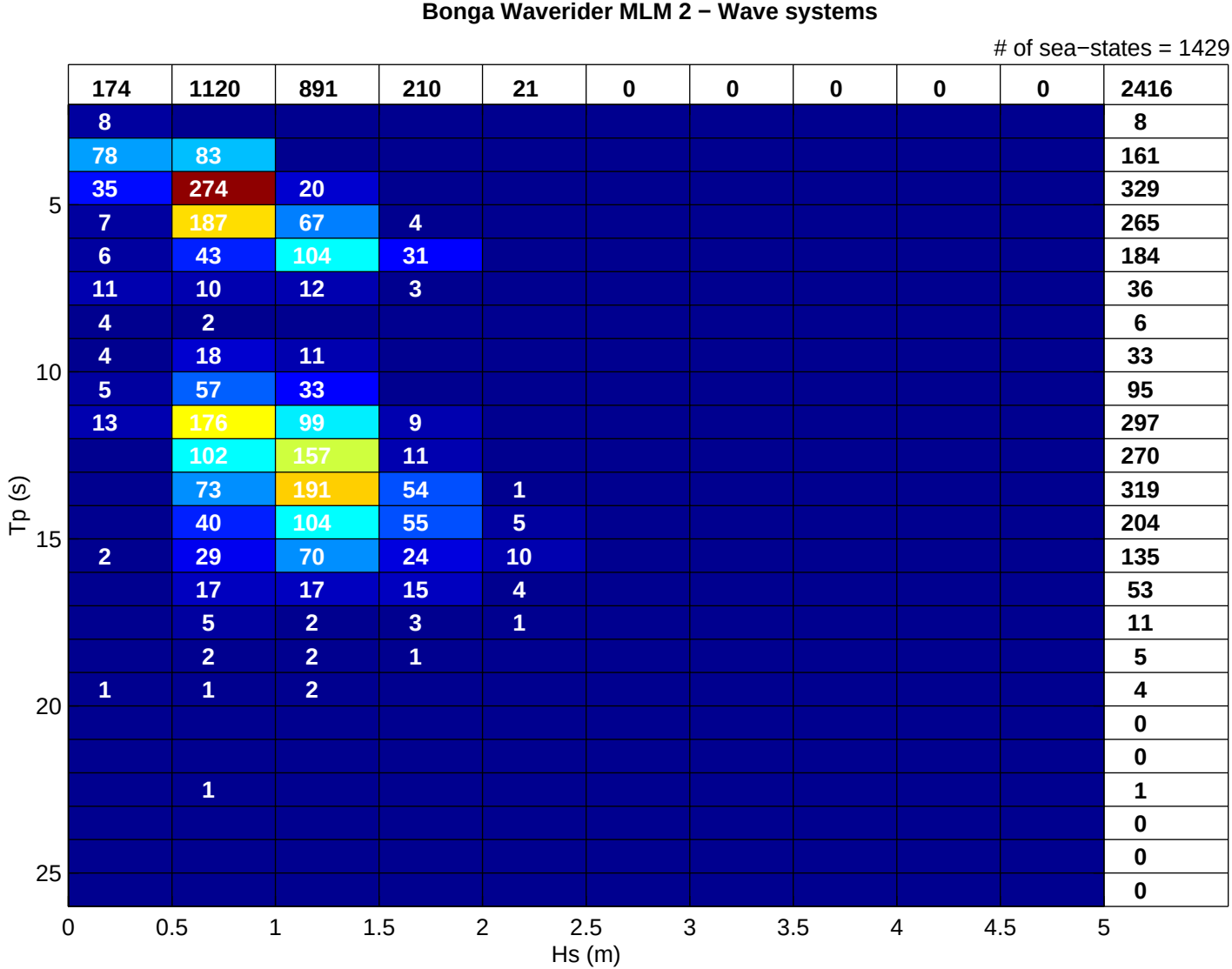

Hindcast WANE QSCAT 28793 − Wave systems: 270°−360°
# of sea−states = 5840
353
104
4
0
0
0
0
0
0
0
461
0
142
6
148
187
76
3
266
12
13
1
26
5
8
13
7
1
8
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
Tp (s)
5
10
15
20
25
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5
Hs (m)

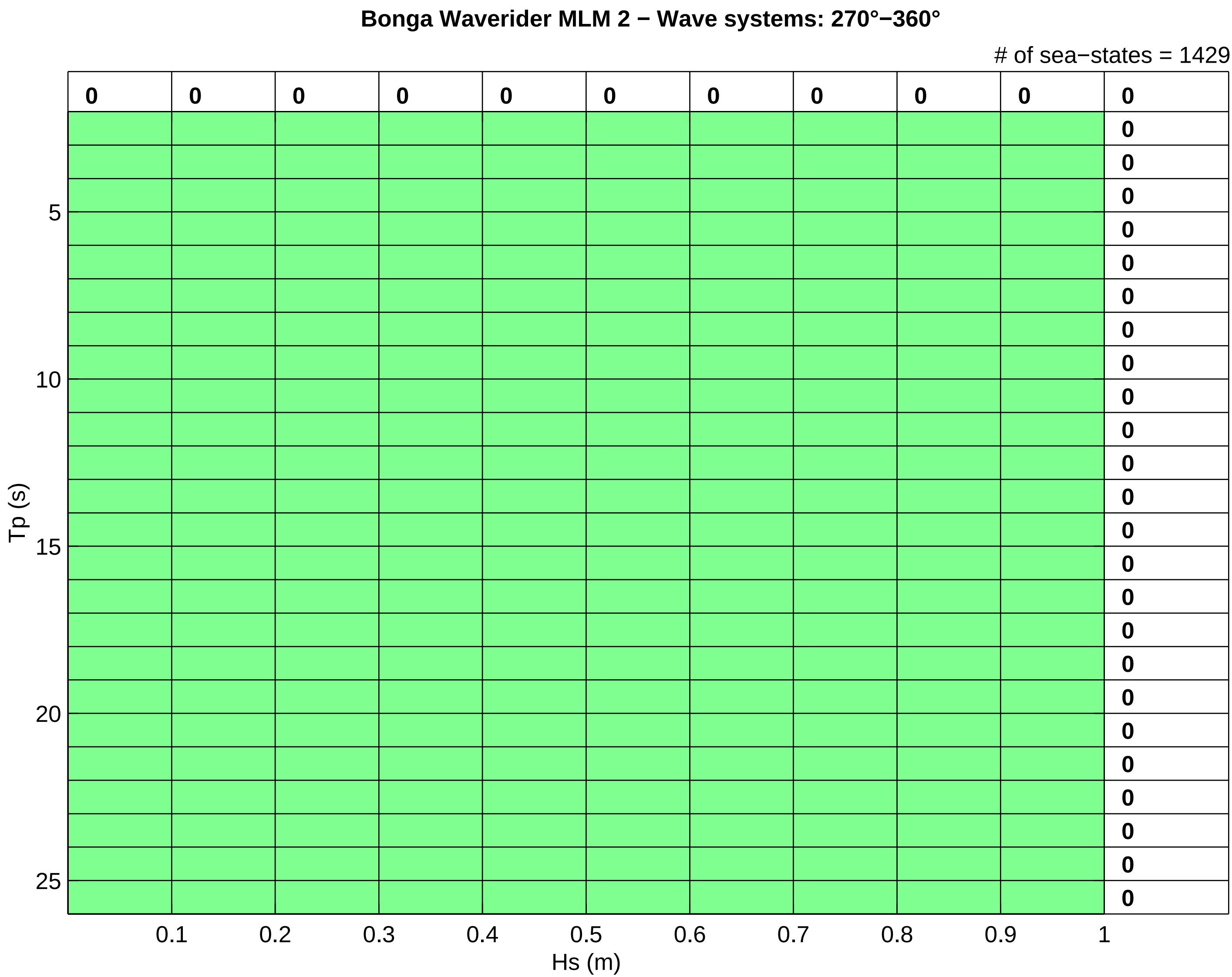

Bonga Waverider MEM 1 − Wave systems
# of sea−states = 569
961 995 472 44 5 0 0 0 0 0 2477
5 5
32 42 74
24 83 22 129
40 189 41 270
60 155 108 4 327
29 36 25 1 91
22 10 2 34
34 52 11 97
36 66 43 6 1 152
78 109 78 10 2 277
97 73 41 2 2 215
92 72 46 5 215
105 52 31 10 198
110 29 13 5 157
100 23 10 1 134
63 3 1 67
19 1 20
14 14
1 1
0
0
0
0
0
Tp (s)
5
10
15
20
25
0 0.5 1 1.5 2 2.5 3 3.5 4 4.5 5
Hs (m)

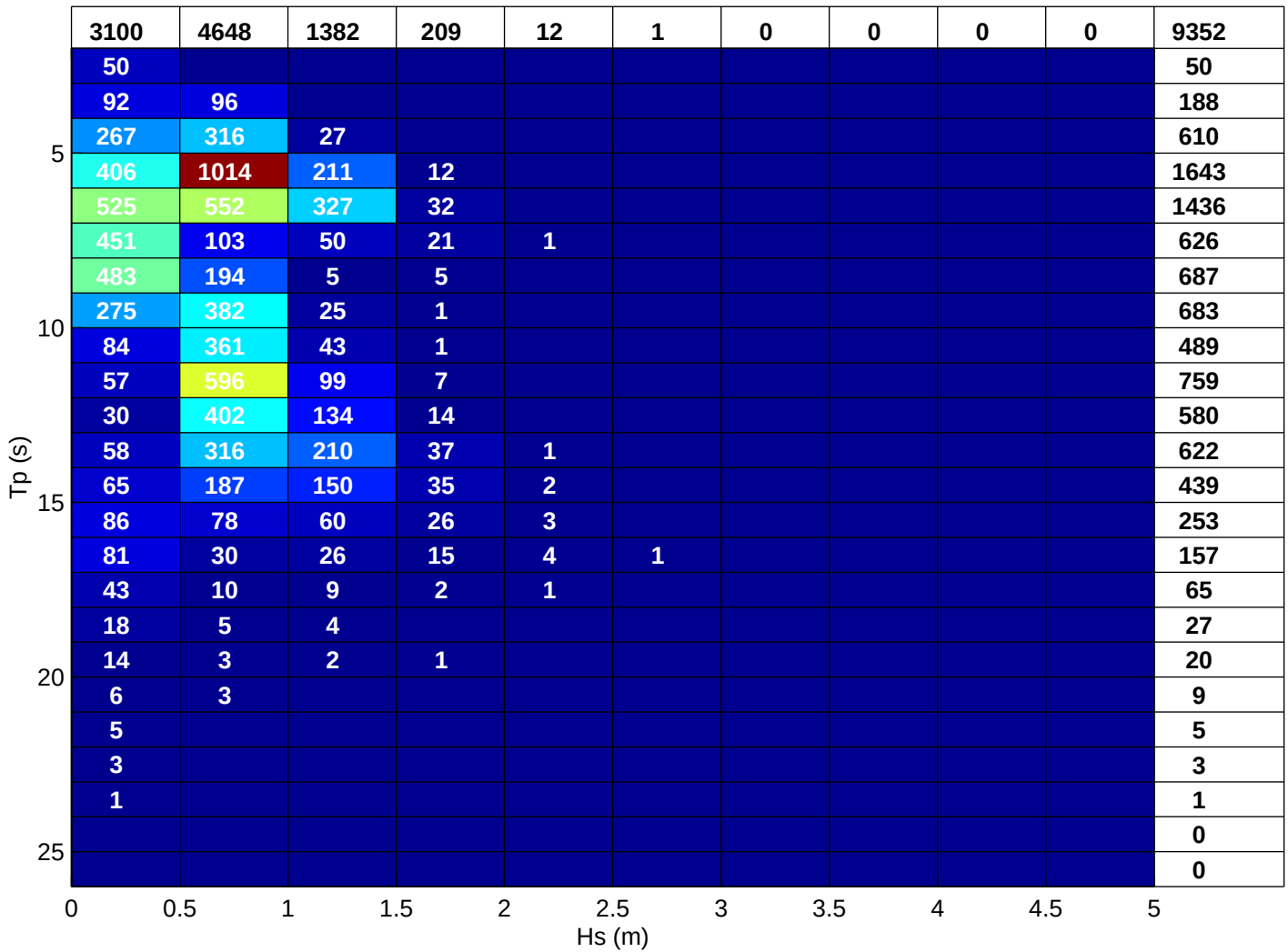

Bonga Waverider MEM 1 − Wave systems: 270°−360°
# of sea−states = 569
224 119 22 0 0 0 0 0 0 0 365
2 2
20 16 36
4 37 4 45
1 38 9 48
1 6 9 16
0
0
0
0
6 6
20 4 24
16 4 20
28 7 35
49 2 51
44 4 48
24 1 25
4 4
5 5
0
0
0
0
0
0
5
10
15
20
25
Tp (s)
0 0.5 1 1.5 2 2.5 3 3.5 4 4.5 5
Hs (m)

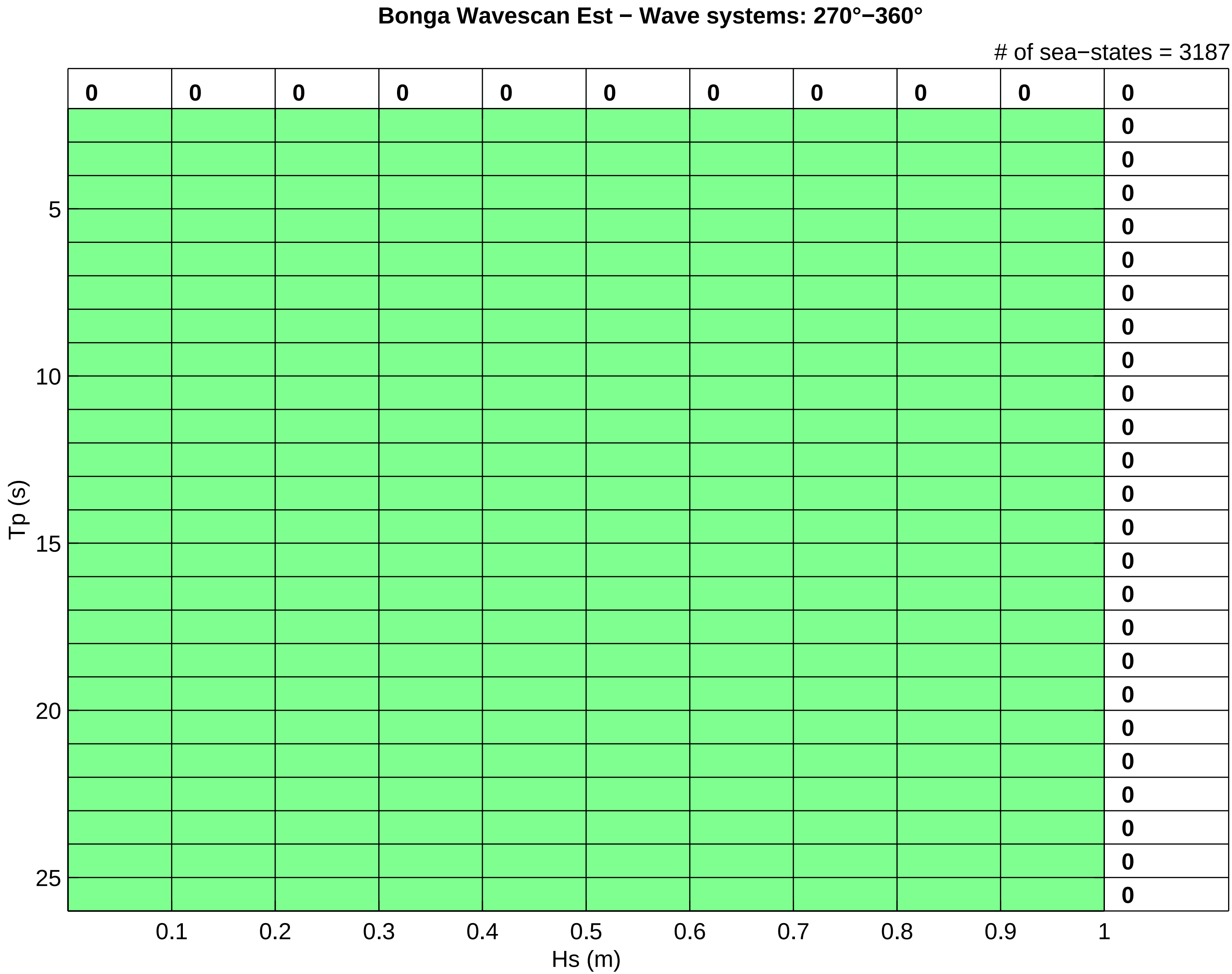

Bonga Waverider MLM 1 − Wave systems
# of sea−states = 569
11 308 529 161 8 0 0 0 0 0 1017
0
4 20 24
22 23 45
90 86 176
21 120 45 1 187
3 8 11 22
0
3 7 10
12 21 15 48
51 79 25 5 160
2 35 45 11 2 95
23 70 14 107
11 40 19 70
1 17 17 16 51
2 11 5 18
2 2
1 1
0
0
1 1
0
0
0
0
5
10
15
20
25
Tp (s)
0 0.5 1 1.5 2 2.5 3 3.5 4 4.5 5
Hs (m)

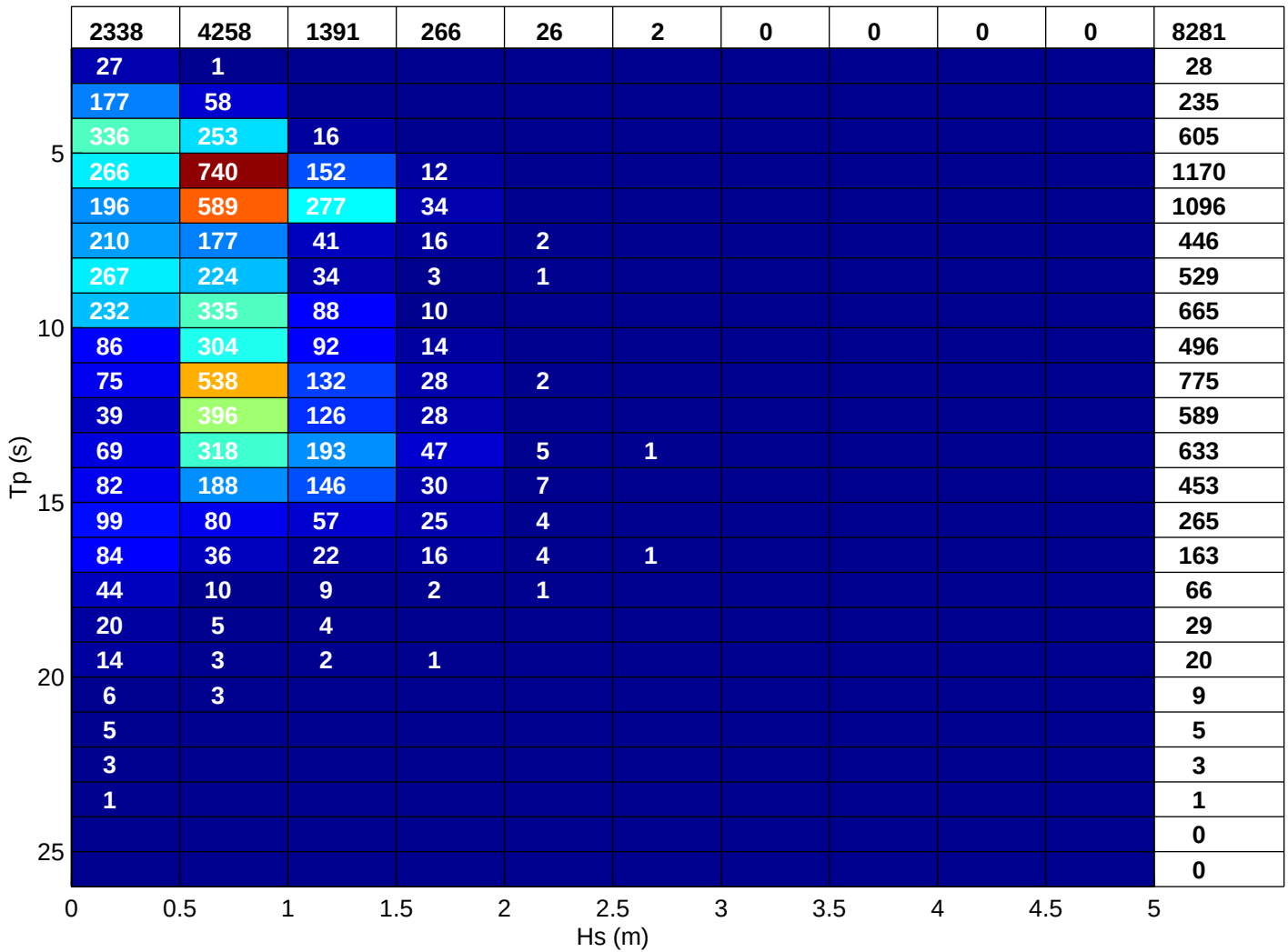

Bonga Waverider MLM 1 − Wave systems: 270°−360°
# of sea−states = 569
0 0 0 0 0 0 0 0 0 0 0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
Tp (s)
5
10
15
20
25
Hs (m)
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1


Bonga Waverider MLM 2 − Wave systems
# of sea−states = 1429
174 1120 891 210 21 0 0 0 0 0 2416
8 8
78 83 161
35 274 20 329
7 187 67 4 265
6 43 104 31 184
11 10 12 3 36
4 2 6
4 18 11 33
5 57 33 95
13 176 99 9 297
102 157 11 270
73 191 54 1 319
40 104 55 5 204
2 29 70 24 10 135
17 17 15 4 53
5 2 3 1 11
2 2 1 5
1 1 2 4
0
0
1 1
0
0
0
Tp (s)
5
10
15
20
25
0 0.5 1 1.5 2 2.5 3 3.5 4 4.5 5
Hs (m)

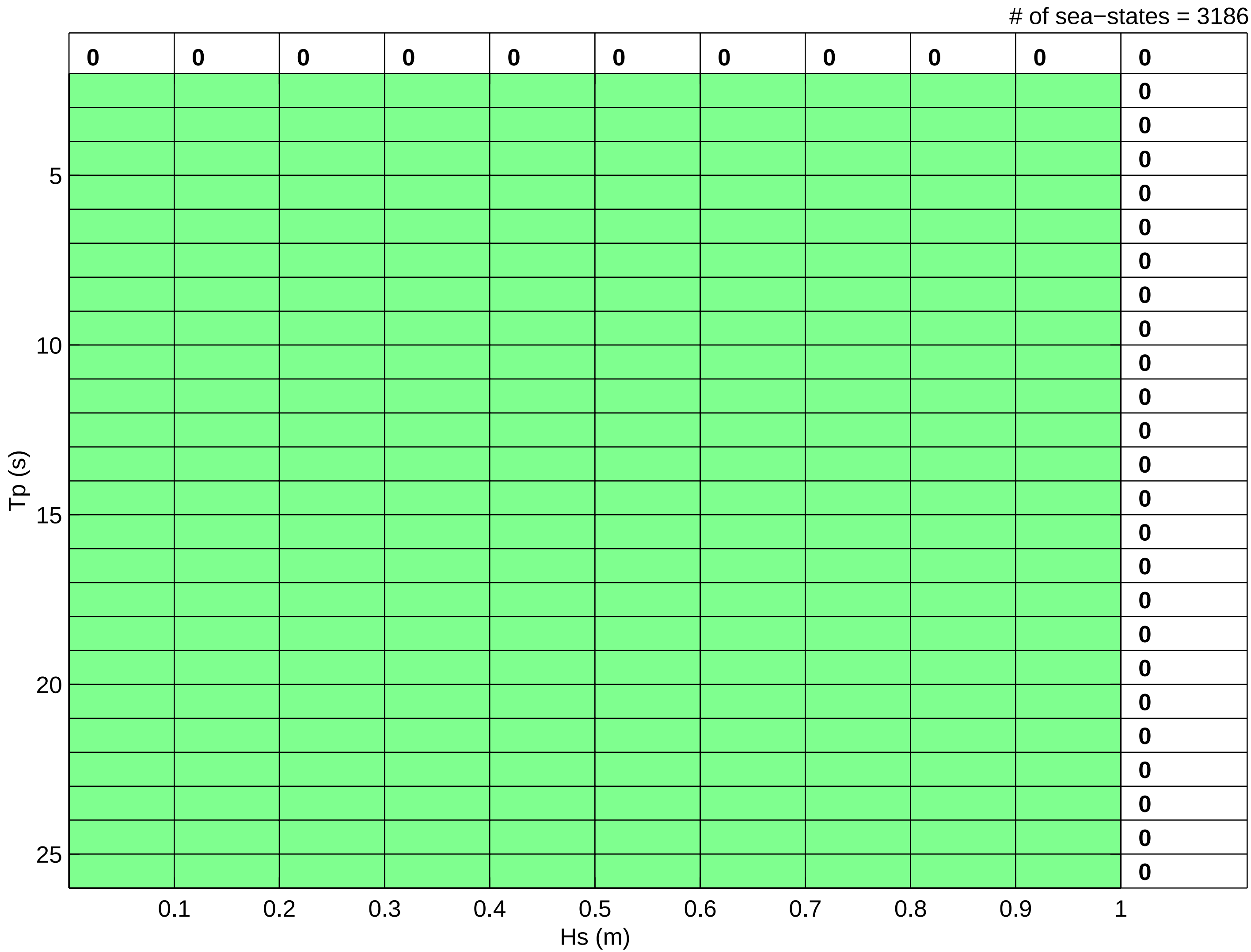

Bonga Waverider MLM 2 − Wave systems: 270°−360°
# of sea−states = 1429
0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
Tp (s)
5
10
15
20
25
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1
Hs (m)

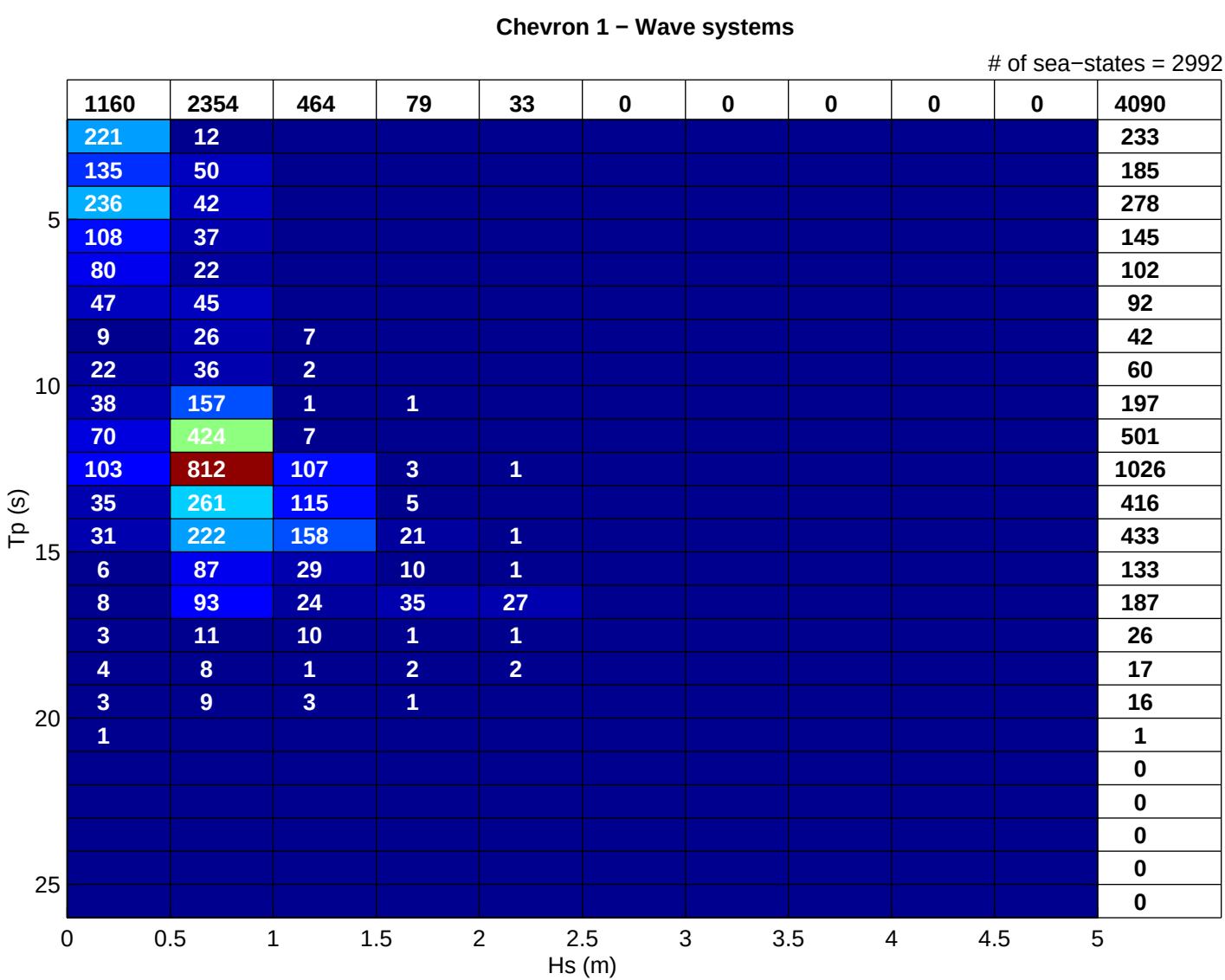

Bonga Wavescan Est − Wave systems
# of sea−states = 3187
3100 4648 1382 209 12 1 0 0 0 0 9352
50 50
92 96 188
267 316 27 610
406 1014 211 12 1643
525 552 327 32 1436
451 103 50 21 1 626
483 194 5 5 687
275 382 25 1 683
84 361 43 1 489
57 596 99 7 759
30 402 134 14 580
58 316 210 37 1 622
65 187 150 35 2 439
86 78 60 26 3 253
81 30 26 15 4 1 157
43 10 9 2 1 65
18 5 4 27
14 3 2 1 20
6 3 9
5 5
3 3
1 1
0
0
5
10
15
20
25
Tp (s)
0 0.5 1 1.5 2 2.5 3 3.5 4 4.5 5
Hs (m)


Bonga Wavescan Est − Wave systems: 270°−360°
# of sea−states = 3187
0 0 0 0 0 0 0 0 0 0 0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
Tp (s)
5
10
15
20
25
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
Hs (m)

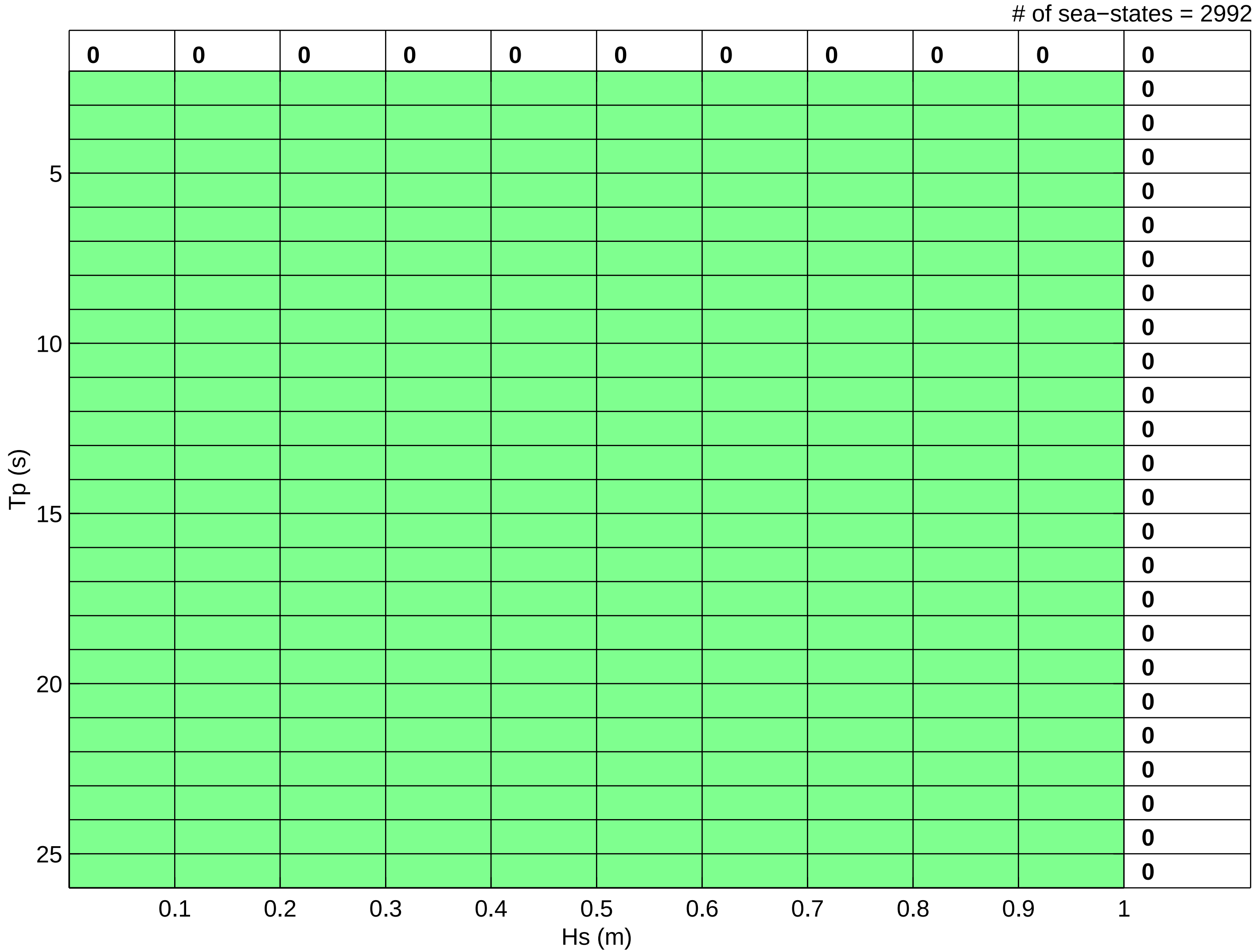

Bonga Wavescan Fix − Wave systems
# of sea−states = 3186
2338 4258 1391 266 26 2 0 0 0 0 8281
27 1 28
177 58 235
336 253 16 605
266 740 152 12 1170
196 589 277 34 1096
210 177 41 16 2 446
267 224 34 3 1 529
232 335 88 10 665
86 304 92 14 496
75 538 132 28 2 775
39 396 126 28 589
69 318 193 47 5 1 633
82 188 146 30 7 453
99 80 57 25 4 265
84 36 22 16 4 1 163
44 10 9 2 1 66
20 5 4 29
14 3 2 1 20
6 3 9
5 5
3 3
1 1
0
0
Tp (s)
5
10
15
20
25
0 0.5 1 1.5 2 2.5 3 3.5 4 4.5 5
Hs (m)

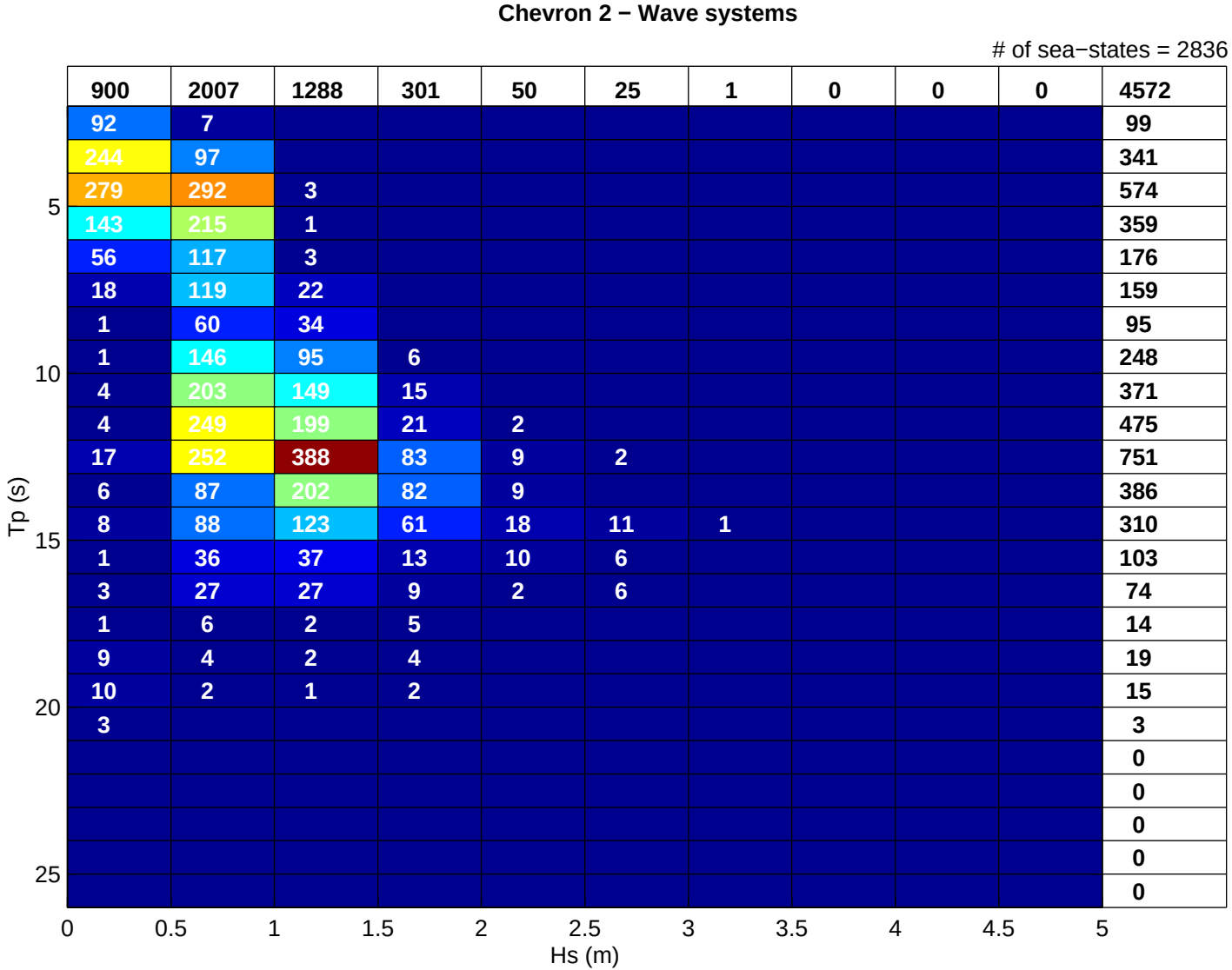
Bonga Wavescan Fix − Wave systems: 270°−360°

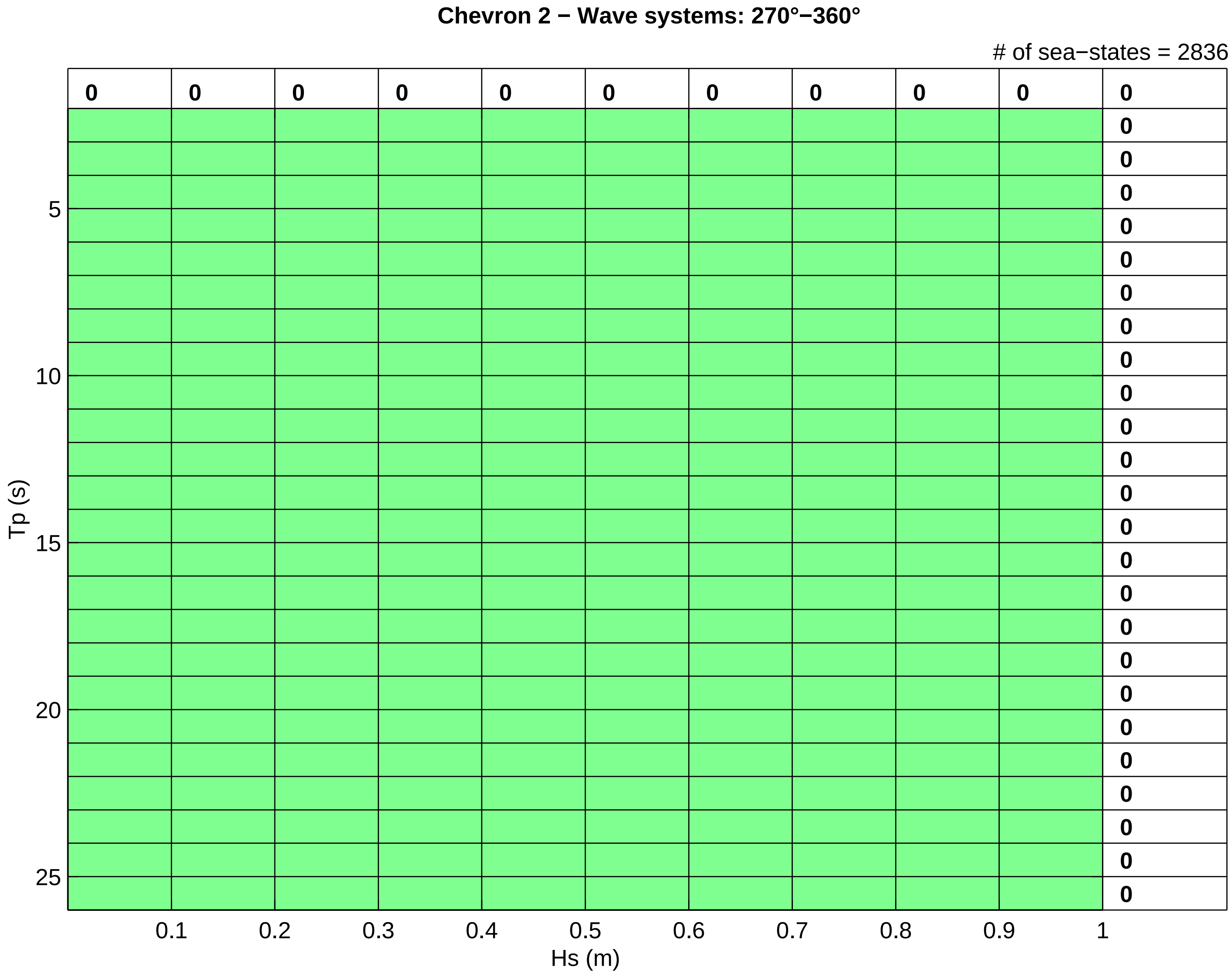


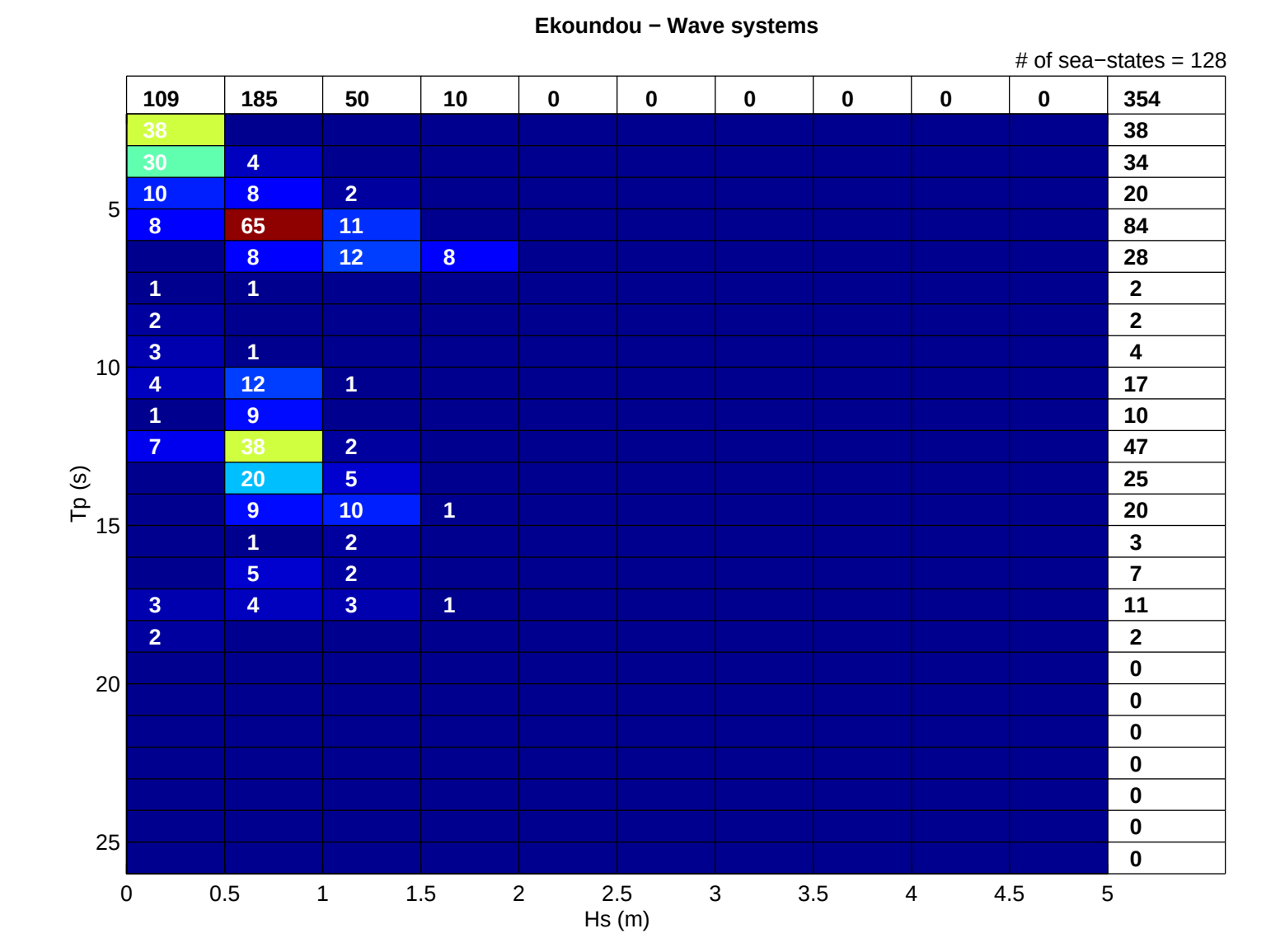

Chevron 1 − Wave systems
# of sea−states = 2992
1160 2354 464 79 33 0 0 0 0 0 4090
221 12 233
135 50 185
236 42 278
108 37 145
80 22 102
47 45 92
9 26 7 42
22 36 2 60
38 157 1 1 197
70 424 7 501
103 812 107 3 1 1026
35 261 115 5 416
31 222 158 21 1 433
6 87 29 10 1 133
8 93 24 35 27 187
3 11 10 1 1 26
4 8 1 2 2 17
3 9 3 1 16
1 1
0
0
0
0
0
Tp (s)
5
10
15
20
25
0 0.5 1 1.5 2 2.5 3 3.5 4 4.5 5
Hs (m)

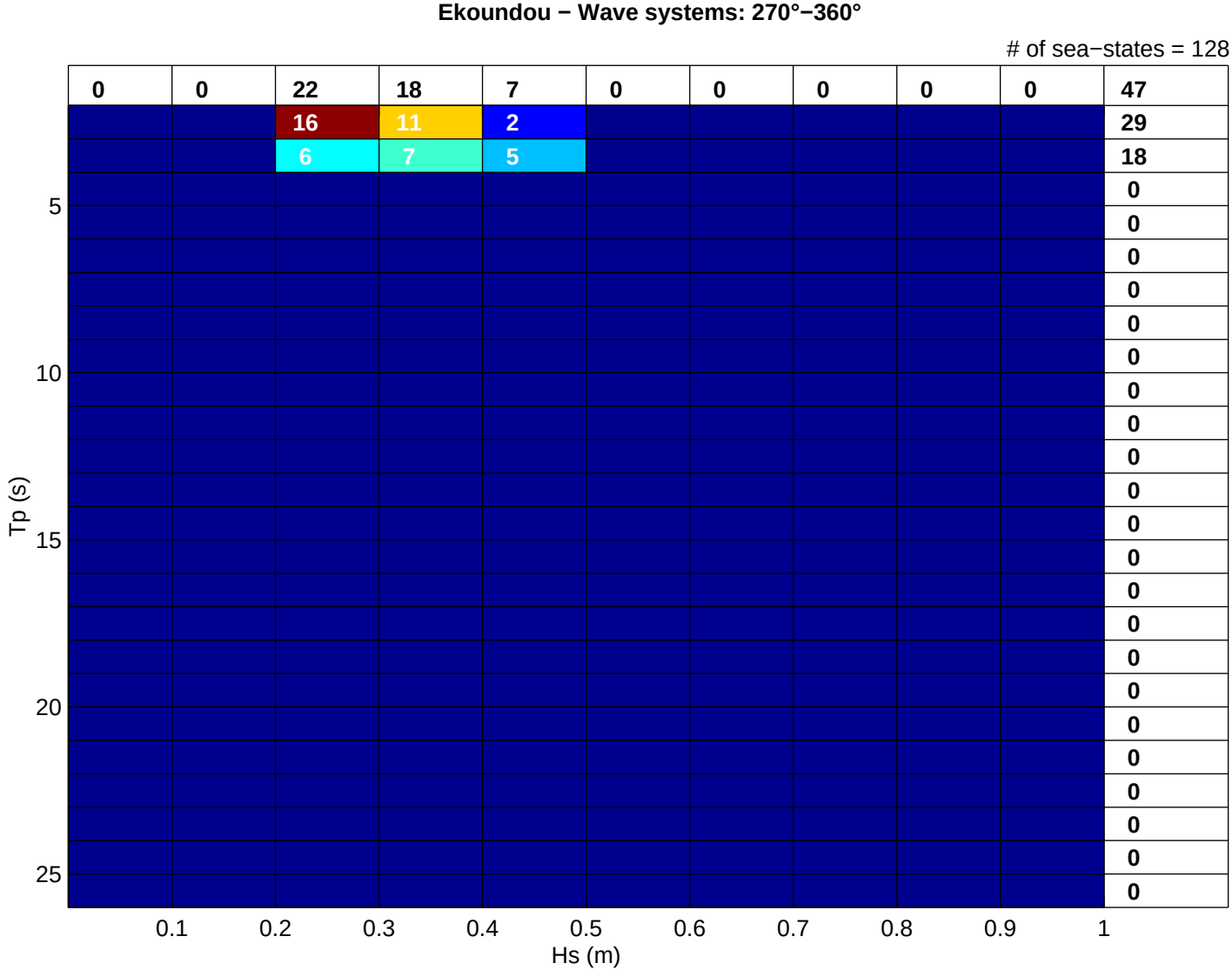
Chevron 1 − Wave systems: 270°−360°

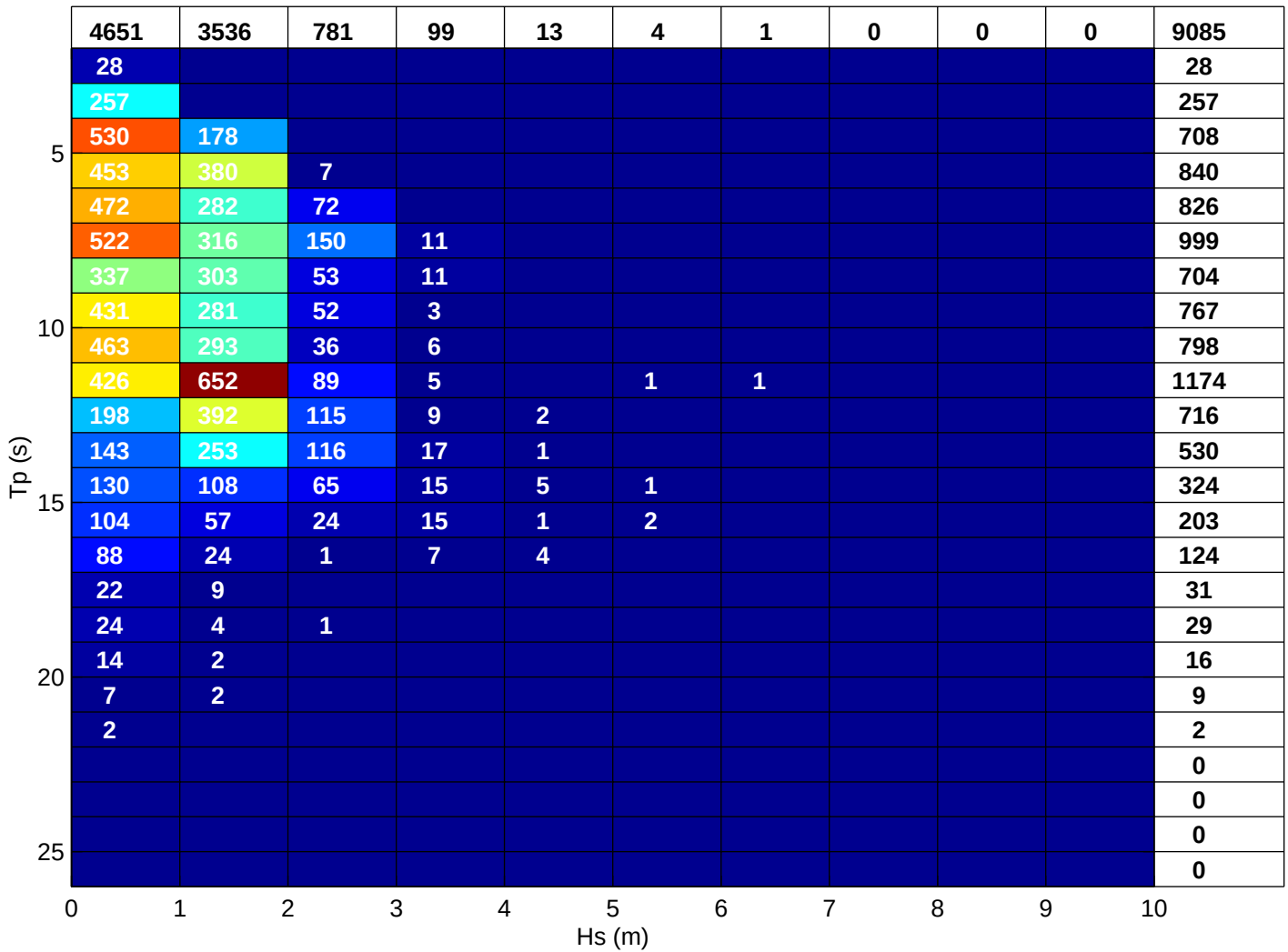


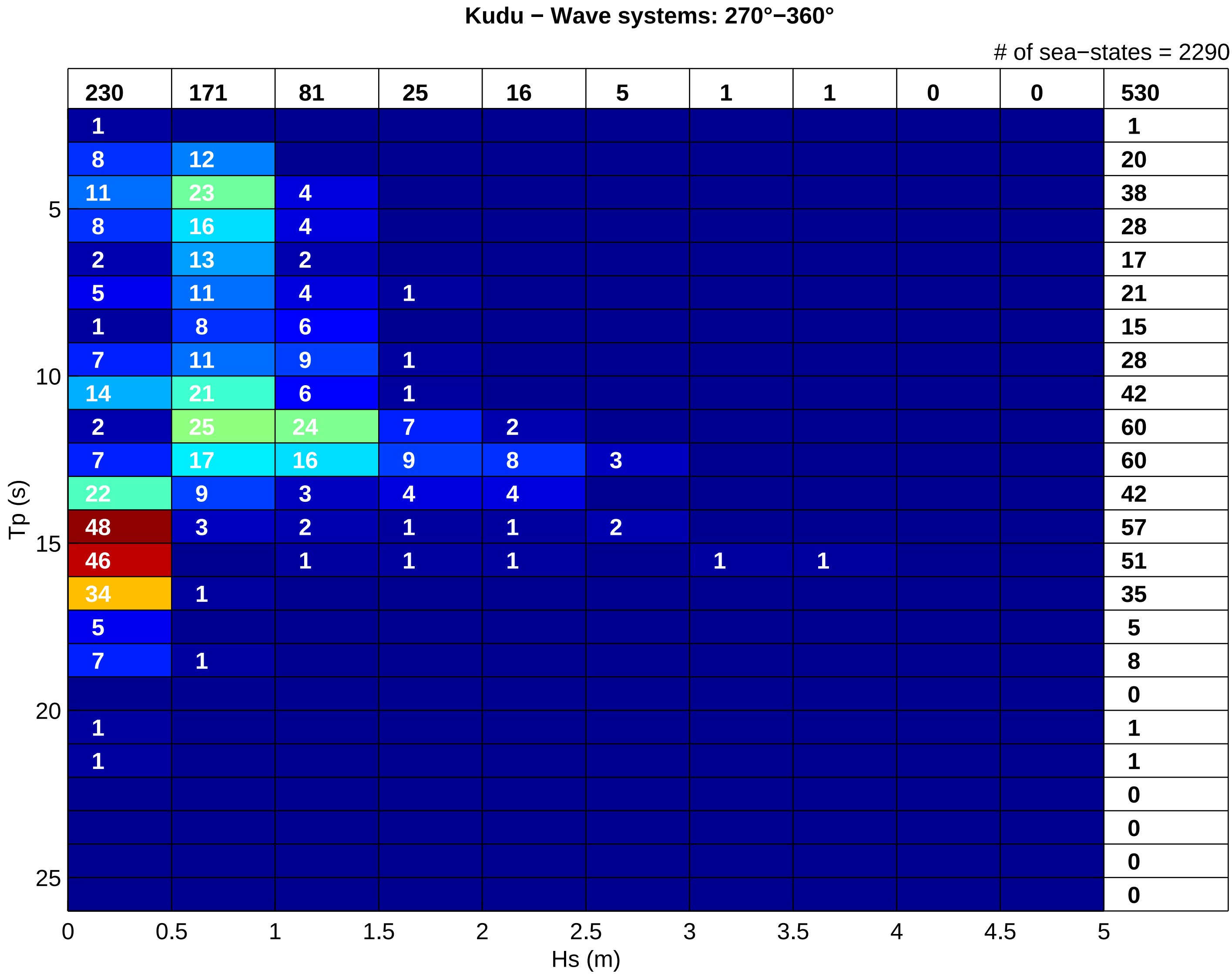

Chevron 2 − Wave systems
# of sea−states = 2836
900 2007 1288 301 50 25 1 0 0 0 4572
92 7 99
244 97 341
279 292 3 574
143 215 1 359
56 117 3 176
18 119 22 159
1 60 34 95
1 146 95 6 248
4 203 149 15 371
4 249 199 21 2 475
17 252 388 83 9 2 751
6 87 202 82 9 386
8 88 123 61 18 11 1 310
1 36 37 13 10 6 103
3 27 27 9 2 6 74
1 6 2 5 14
9 4 2 4 19
10 2 1 2 15
3 3
0
0
0
0
0
Tp (s)
5
10
15
20
25
0 0.5 1 1.5 2 2.5 3 3.5 4 4.5 5
Hs (m)


Chevron 2 − Wave systems: 270°−360°
# of sea−states = 2836
0
0
0
0
0
0
0
0
0
0
0
Tp (s)
5
10
15
20
25
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
Hs (m)


Ekoundou − Wave systems
# of sea−states = 128
109 185 50 10 0 0 0 0 0 0 354
38 38
30 4 34
10 8 2 20
8 65 11 84
8 12 8 28
1 1 2
2 2
3 1 4
4 12 1 17
1 9 10
7 38 2 47
20 5 25
9 10 1 20
1 2 3
5 2 7
3 4 3 1 11
2 2
0
0
0
0
0
0
0
Tp (s)
5
10
15
20
25
0 0.5 1 1.5 2 2.5 3 3.5 4 4.5 5
Hs (m)


Ekoundou − Wave systems: 270°−360°
# of sea−states = 128
0 0 22 18 7 0 0 0 0 0 47
16 11 2 29
6 7 5 18
0
Tp (s)
5
10
15
20
25
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1
Hs (m)

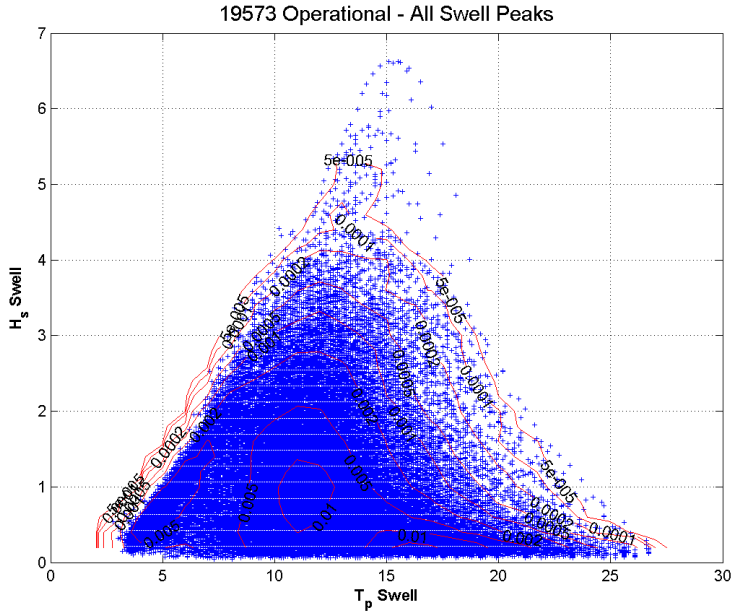

Kudu − Wave systems
# of sea−states = 2290
4651 3536 781 99 13 4 1 0 0 0 9085
28 28
257 257
530 178 708
453 380 7 840
472 282 72 826
522 316 150 11 999
337 303 53 11 704
431 281 52 3 767
463 293 36 6 798
426 652 89 5 1 1 1174
198 392 115 9 2 716
143 253 116 17 1 530
130 108 65 15 5 1 324
104 57 24 15 1 2 203
88 24 1 7 4 124
22 9 31
24 4 1 29
14 2 16
7 2 9
2 2
0
0
0
0
Tp (s)
5
10
15
20
25
0 1 2 3 4 5 6 7 8 9 10
Hs (m)

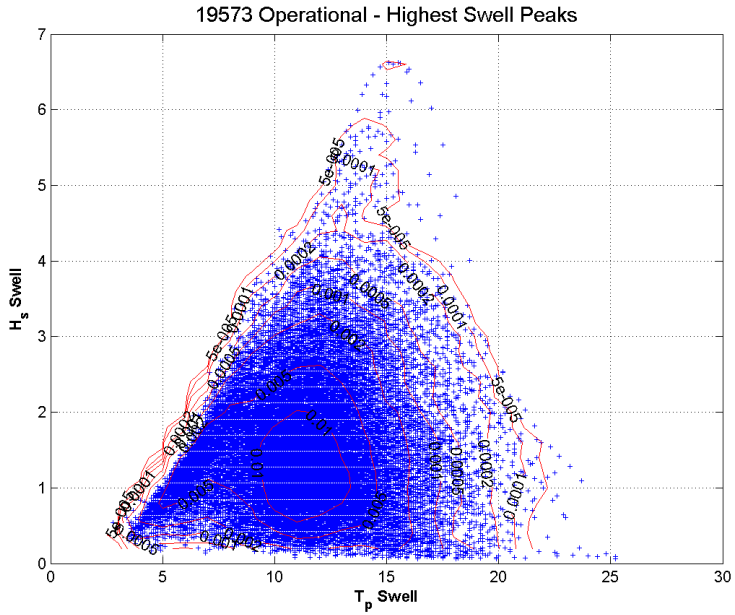

Kudu − Wave systems: 270°−360°
# of sea−states = 2290
230 171 81 25 16 5 1 1 0 0 530
1
8 12
11 23 4
8 16 4
2 13 2
5 11 4 1
1 8 6
7 11 9 1
14 21 6 1
2 25 24 7 2
7 17 16 9 8 3
22 9 3 4 4
48 3 2 1 1 2
46 1 1 1 1 1
34 1
5
7 1
1
1
1
20
38
28
17
21
15
28
42
60
60
42
57
51
35
5
8
0
1
1
0
0
0
0
Tp (s)
5
10
15
20
25
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5
Hs (m)

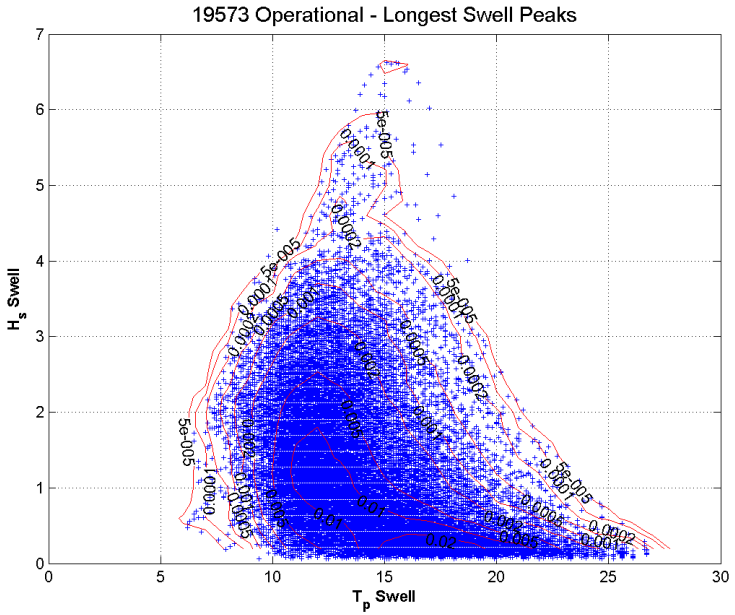
Appendix 8.2

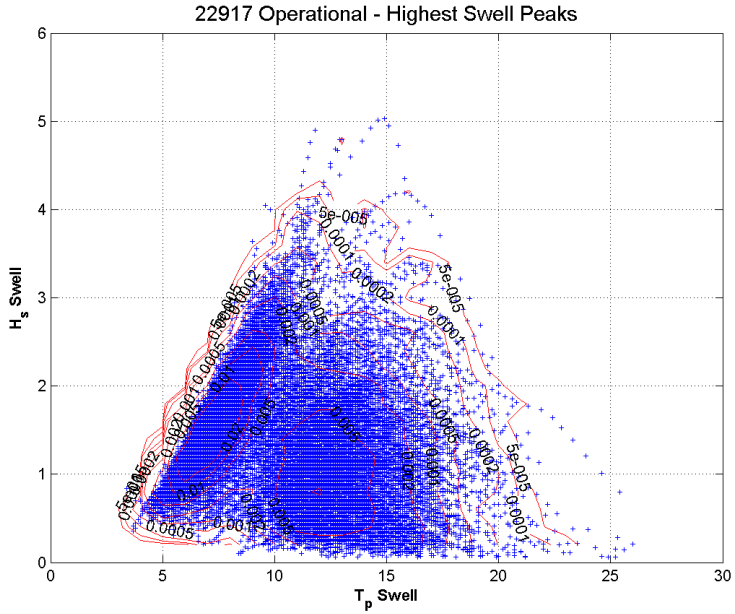
Kernel Density Estimates for Partitioned Wave Height and Period

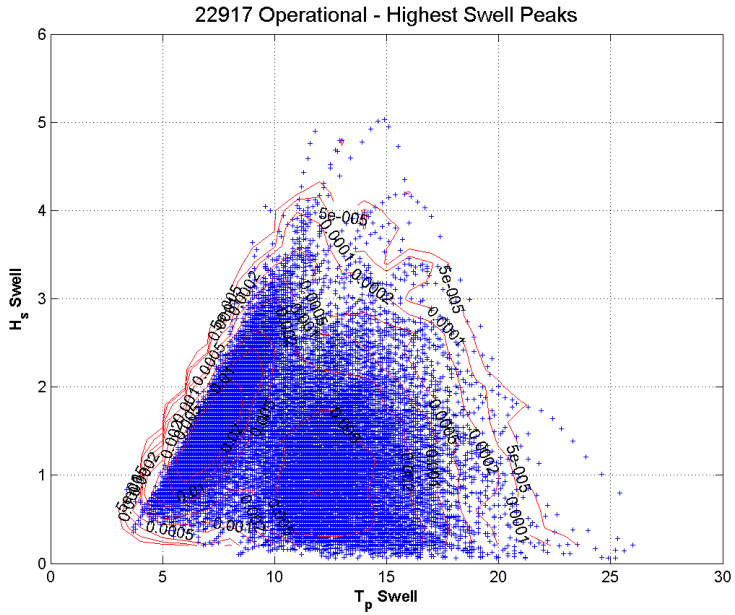
WANE Operational Data

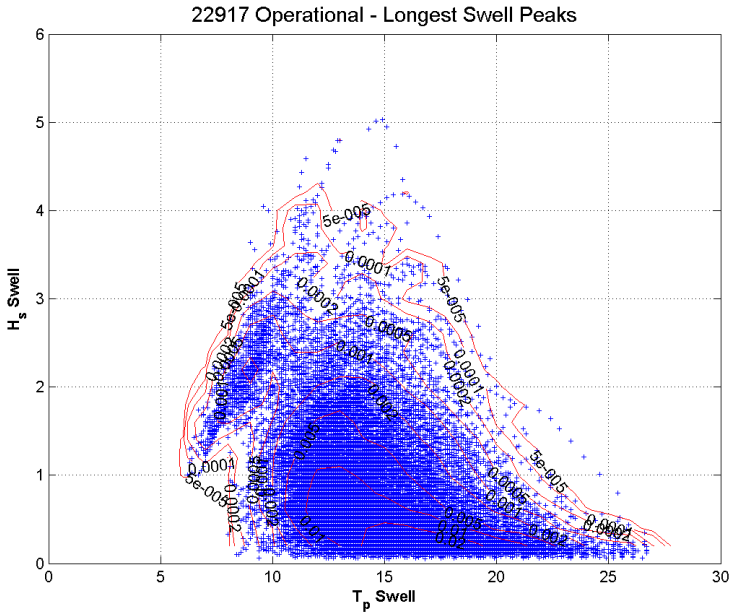

19573 Operational - All Swell Peaks
H_s Swell
T_p Swell

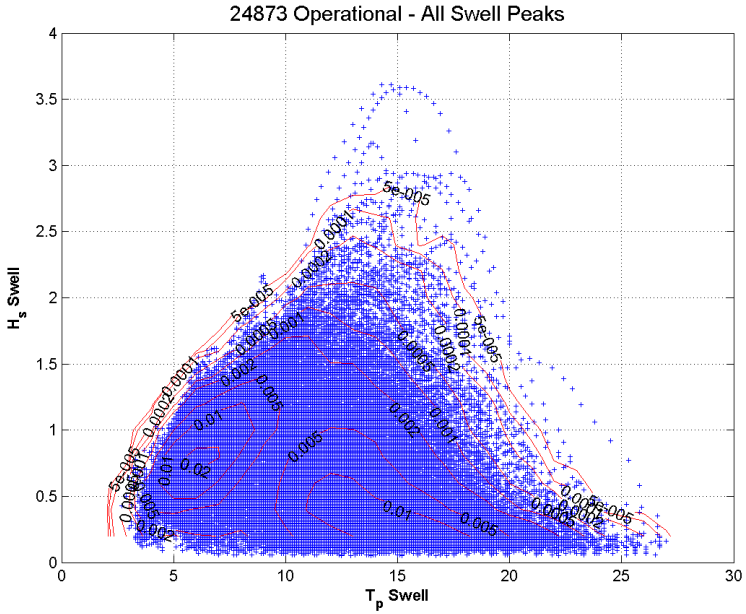

19573 Operational - Highest Swell Peaks
H_s Swell
T_p Swell

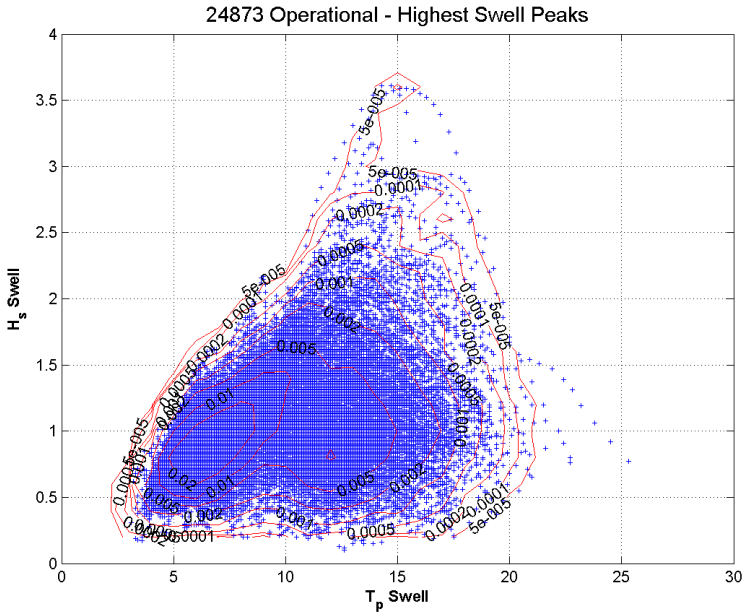

19573 Operational - Longest Swell Peaks
H_s Swell
T_p Swell

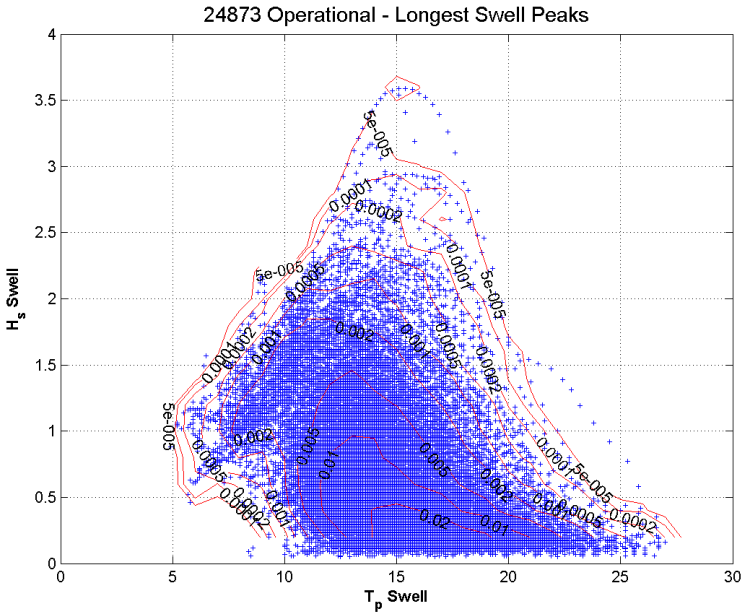

22917 Operational - Highest Swell Peaks
H_s Swell
T_p Swell

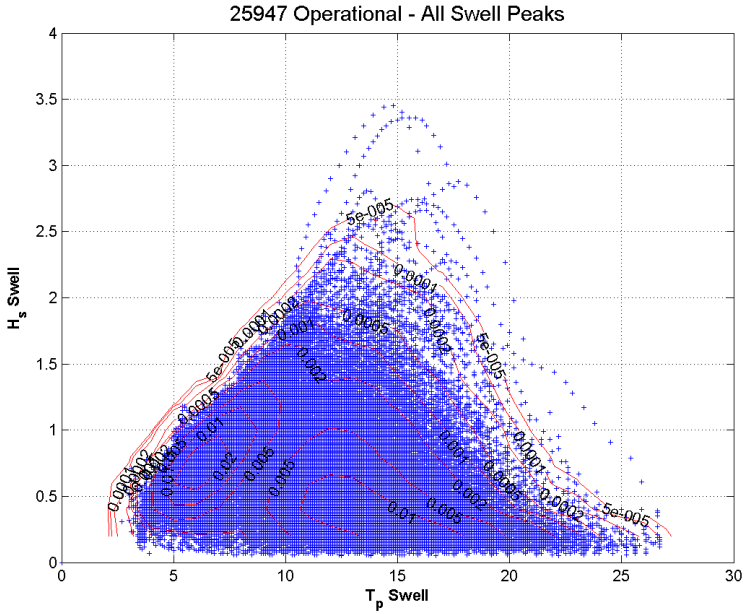

22917 Operational - Highest Swell Peaks
H_s Swell
T_p Swell

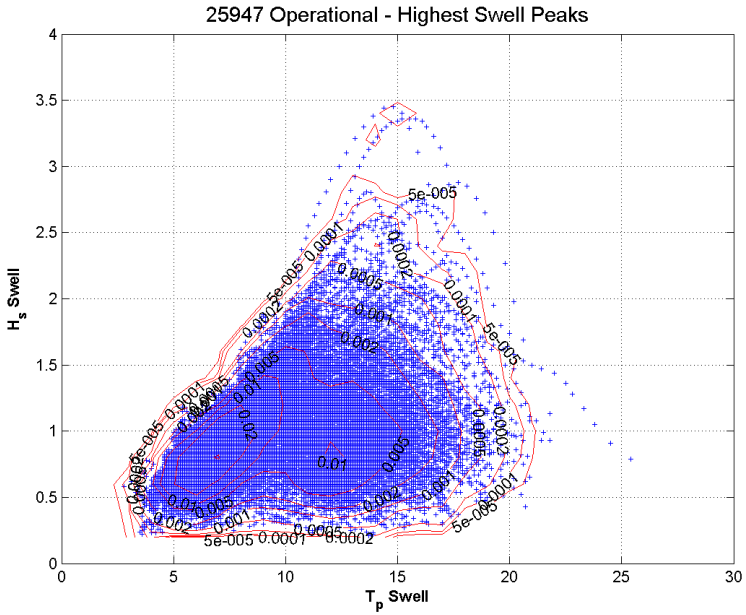

22917 Operational - Longest Swell Peaks
H_s Swell
T_p Swell

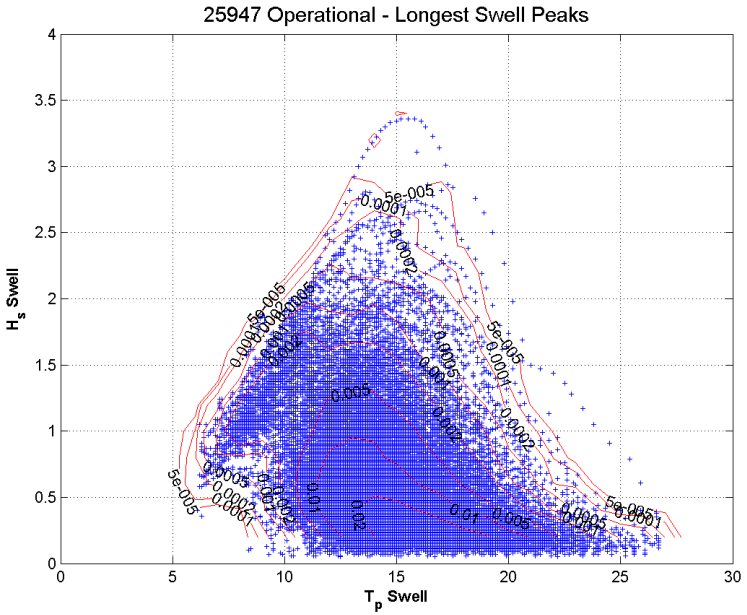

24873 Operational - All Swell Peaks
H_s Swell
T_p Swell


24873 Operational - Highest Swell Peaks
H_s Swell
T_p Swell


24873 Operational - Longest Swell Peaks
H_s Swell
T_p Swell


25947 Operational - All Swell Peaks
H_s Swell
T_p Swell


25947 Operational - Highest Swell Peaks
H_s Swell
T_p Swell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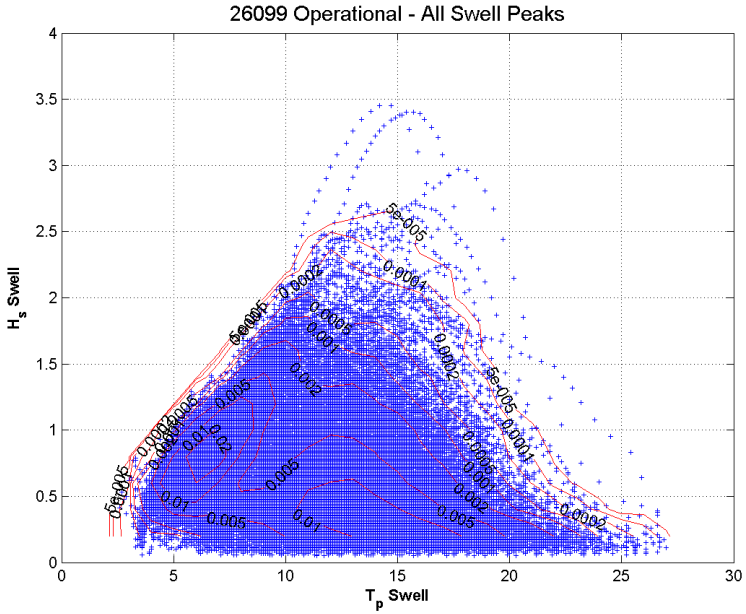
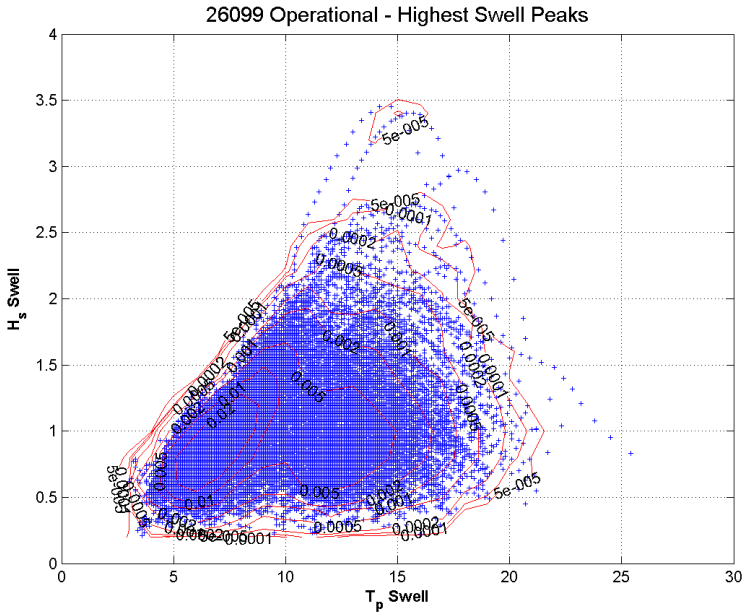
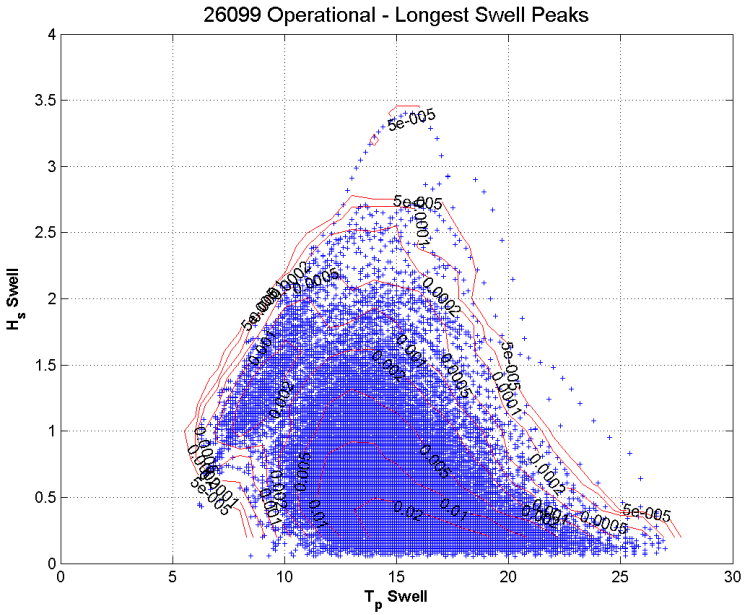
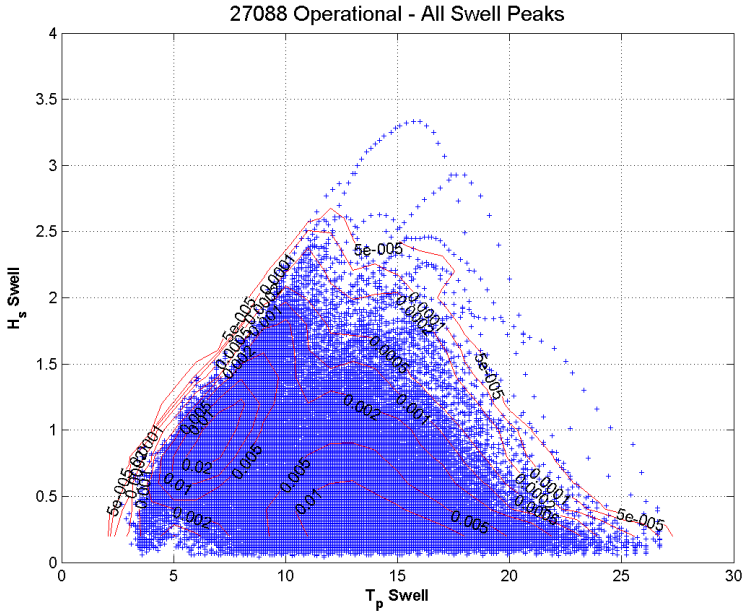
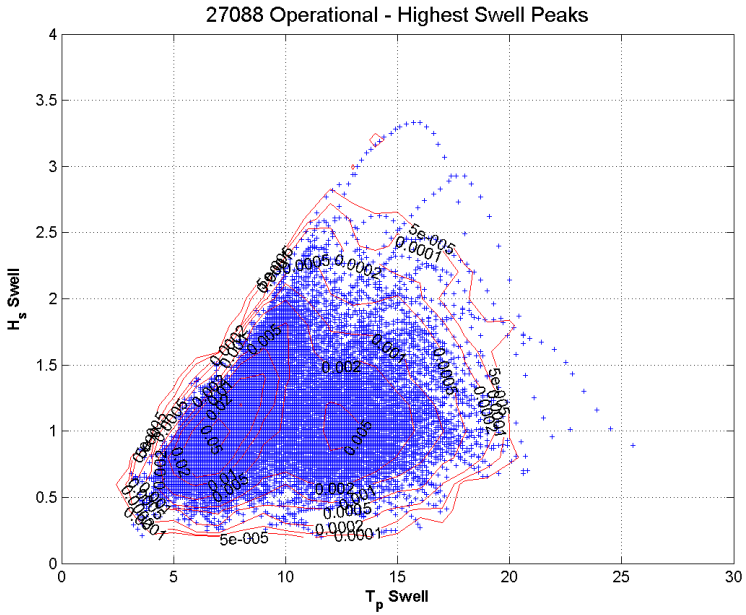
H_s Swell
T_p Swell

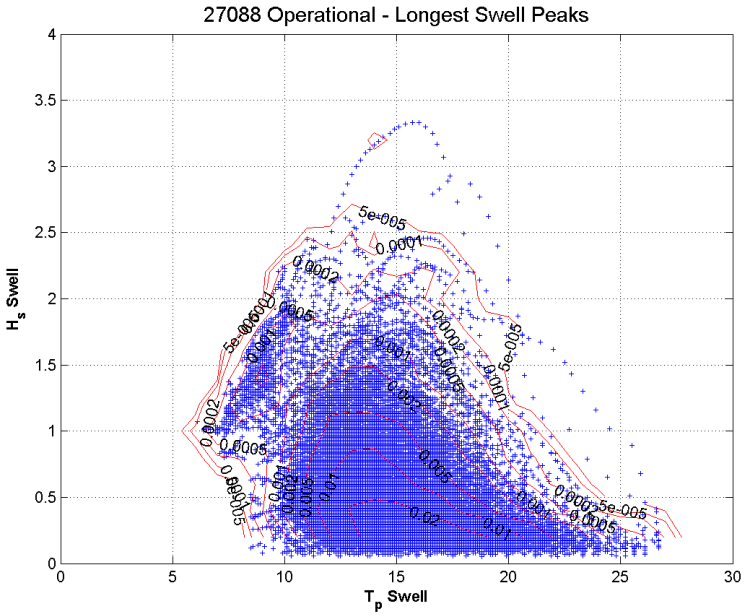

26099 Operational - All Swell Peaks
H_s Swell
T_p Swell

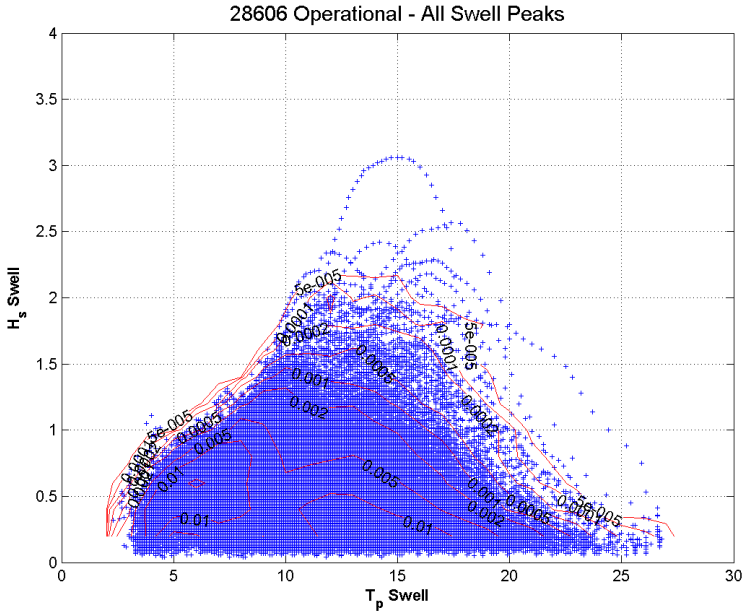

26099 Operational - Highest Swell Peaks
H_s Swell
T_p Swell


26099 Operational - Longest Swell Peaks
H_s Swell
T_p Swell


27088 Operational - All Swell Peaks
H_s Swell
T_p Swell


27088 Operational - Highest Swell Peaks
H_s Swell
T_p Swell


27088 Operational - Longest Swell Peaks
H_s Swell
T_p Swell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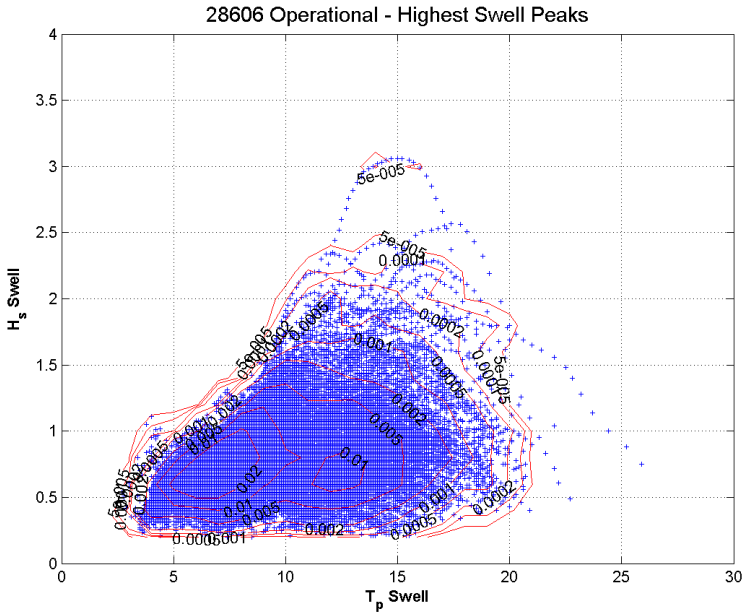
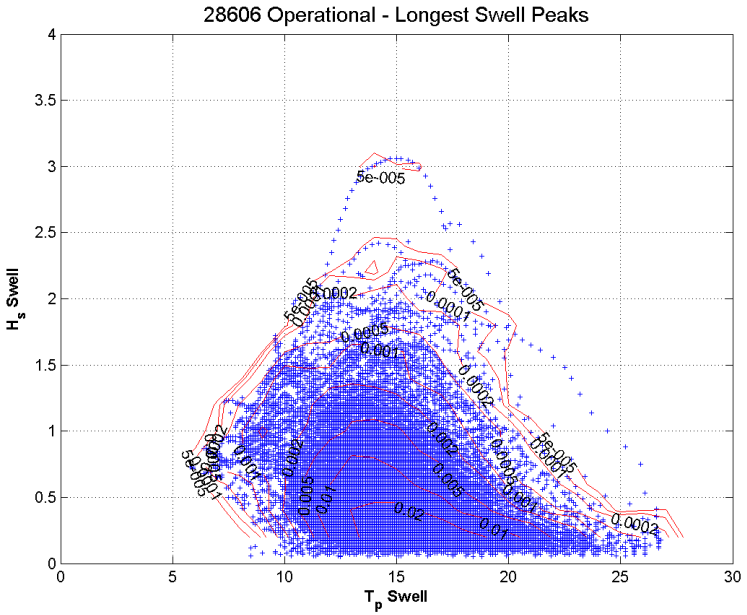
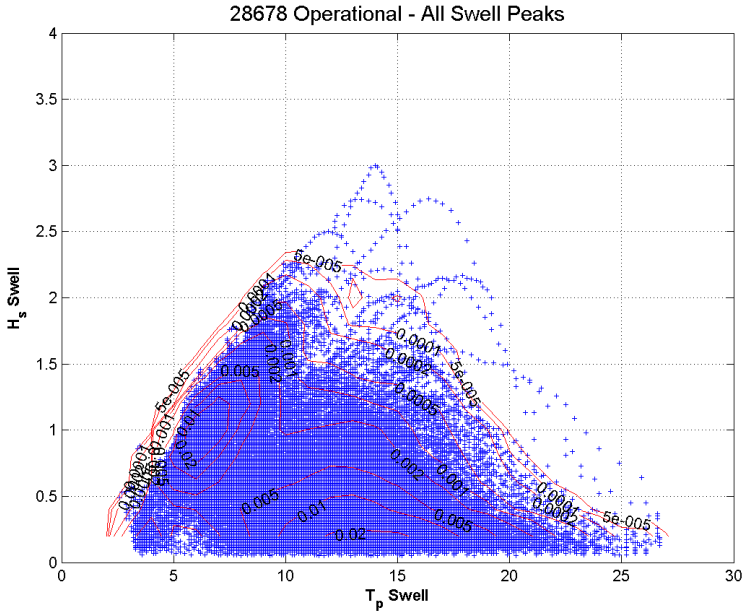
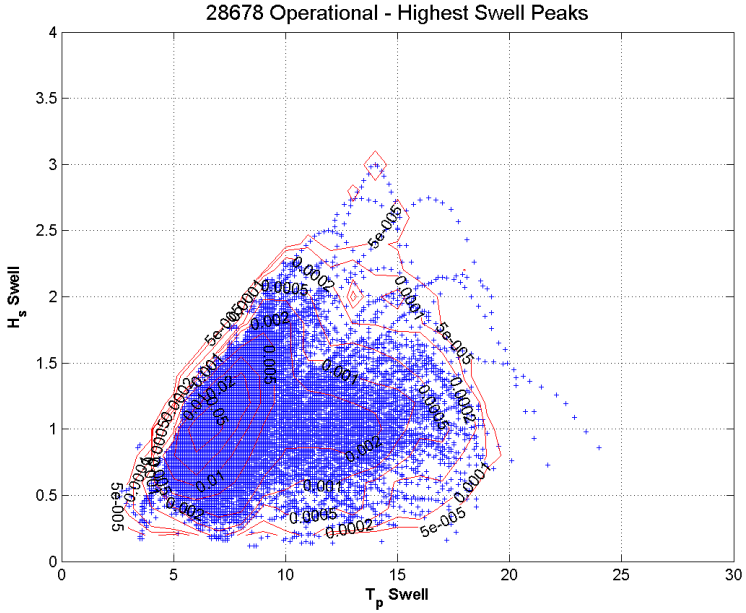
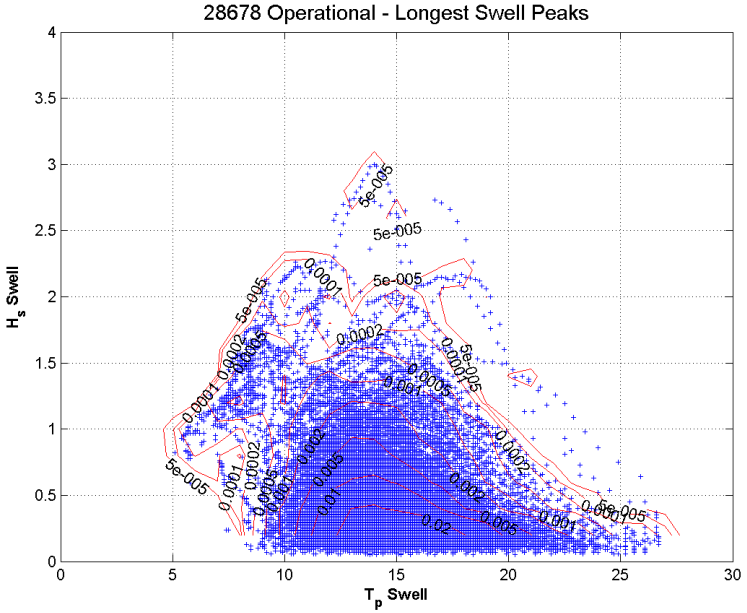
T_p Swell

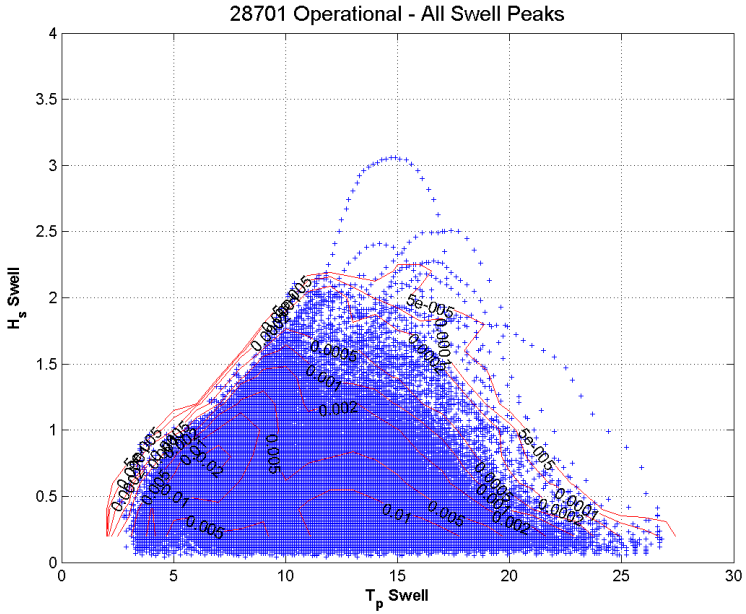

28606 Operational - Highest Swell Peaks
H_s Swell
T_p Swell

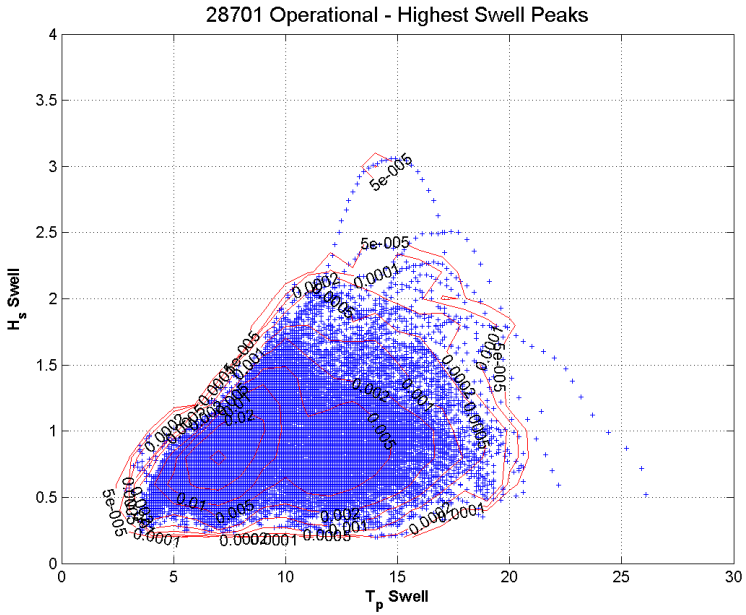

28606 Operational - Longest Swell Peaks
H_s Swell
T_p Swell

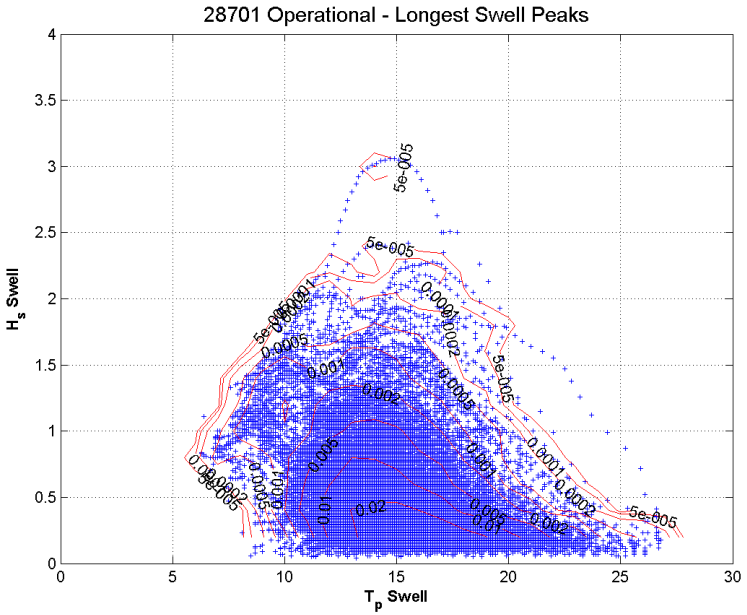

28678 Operational - All Swell Peaks
H_s Swell
T_p Swell

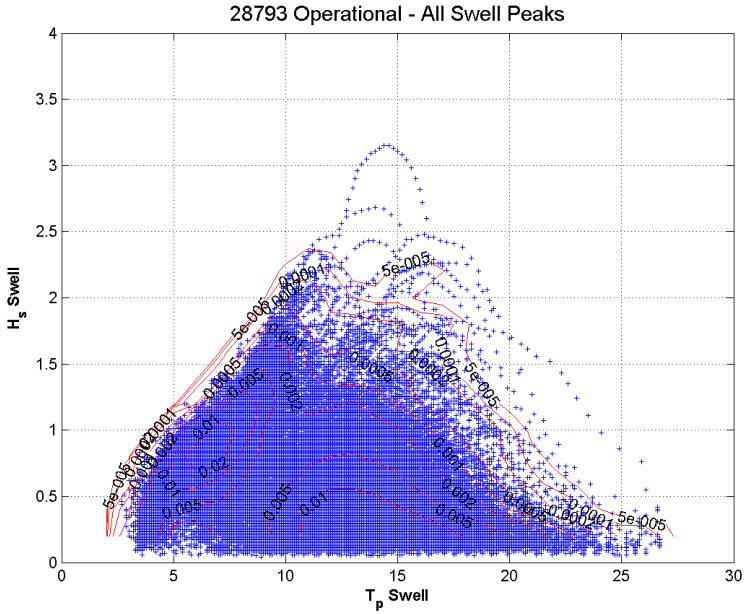

28678 Operational - Highest Swell Peaks
H_s Swell
T_p Swell

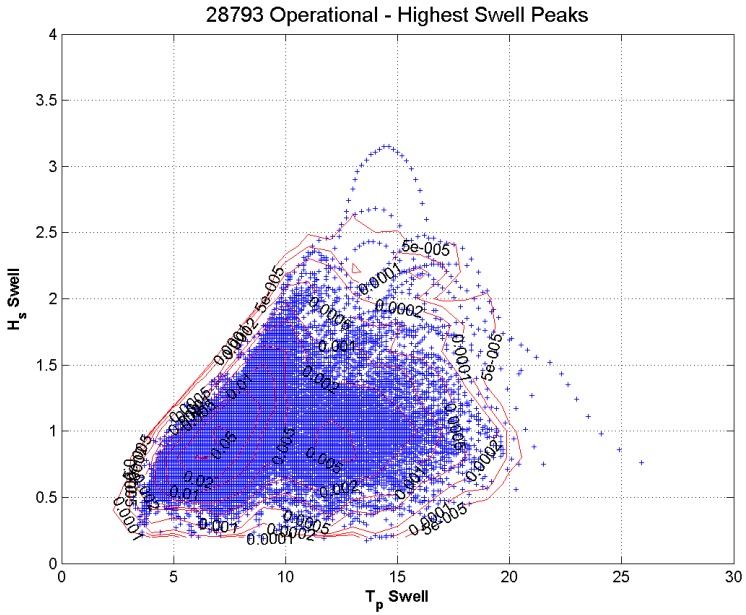

28678 Operational - Longest Swell Peaks
H_s Swell
T_p Swell

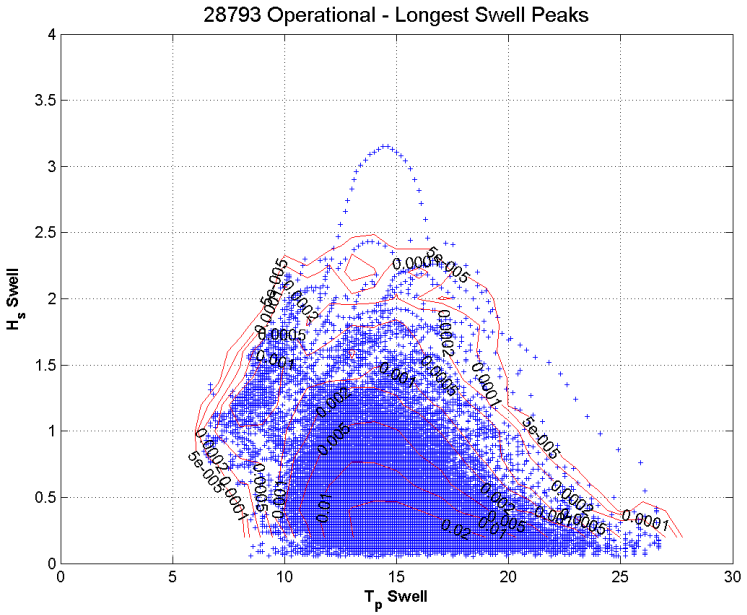

28701 Operational - All Swell Peaks
H_s Swell
T_p Swell


28701 Operational - Highest Swell Peaks
H_s Swell
T_p Swell


28701 Operational - Longest Swell Peaks
H_s Swell
T_p Swell


28793 Operational - All Swell Peaks
H_s Swell
T_p Swell

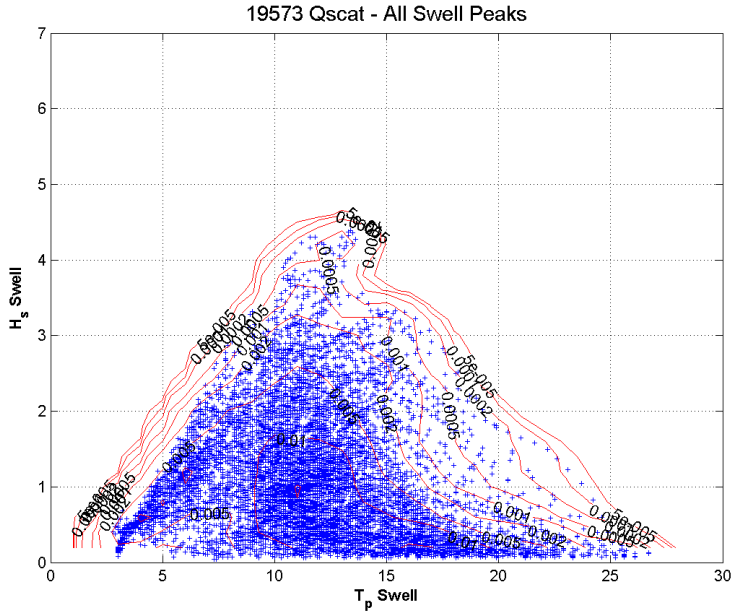

28793 Operational - Highest Swell Peaks
H_s Swell
T_p Swell

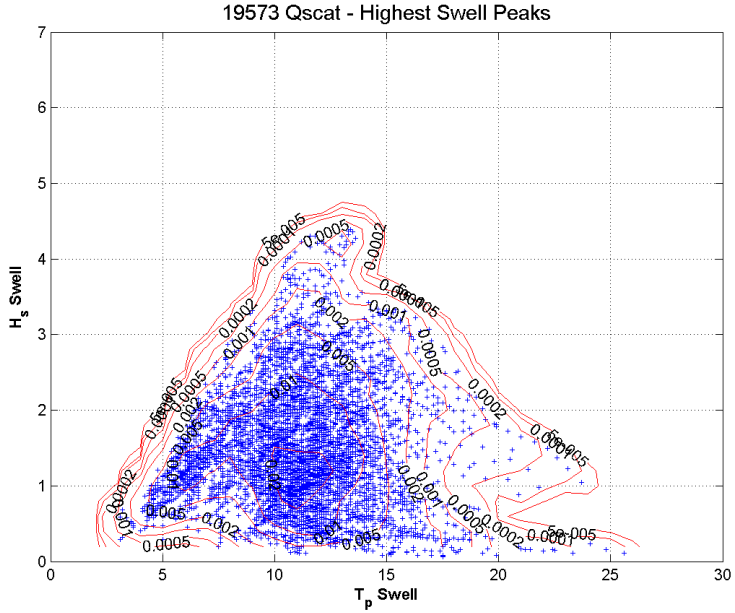

28793 Operational - Longest Swell Peaks
H_s Swell
T_p Swell

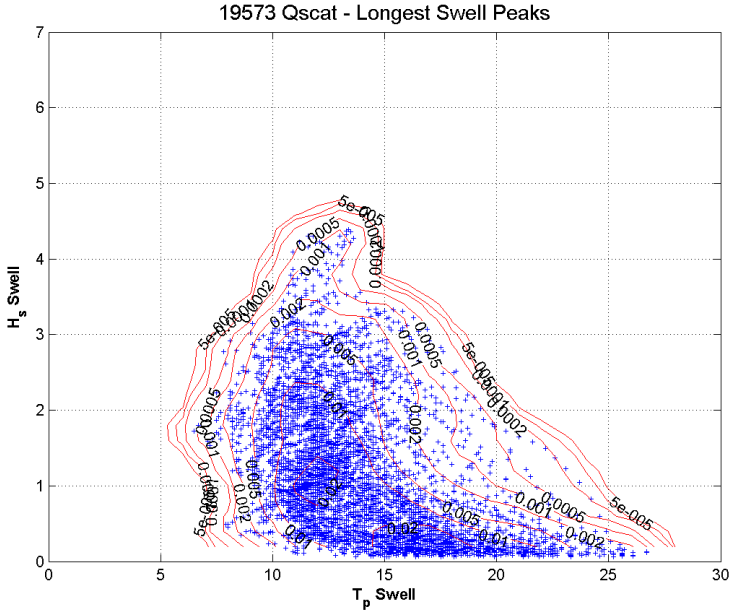
Appendix 8.3

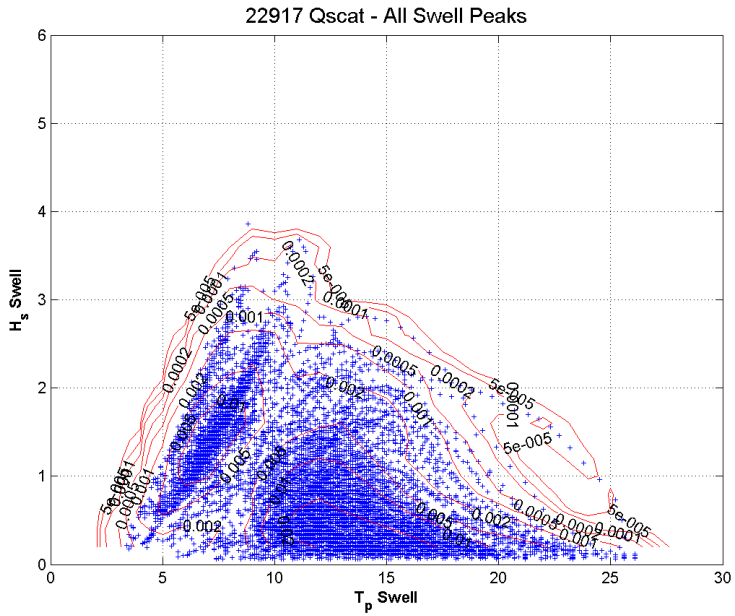
Kernel Density Estimates for Partitioned Wave Height and Period

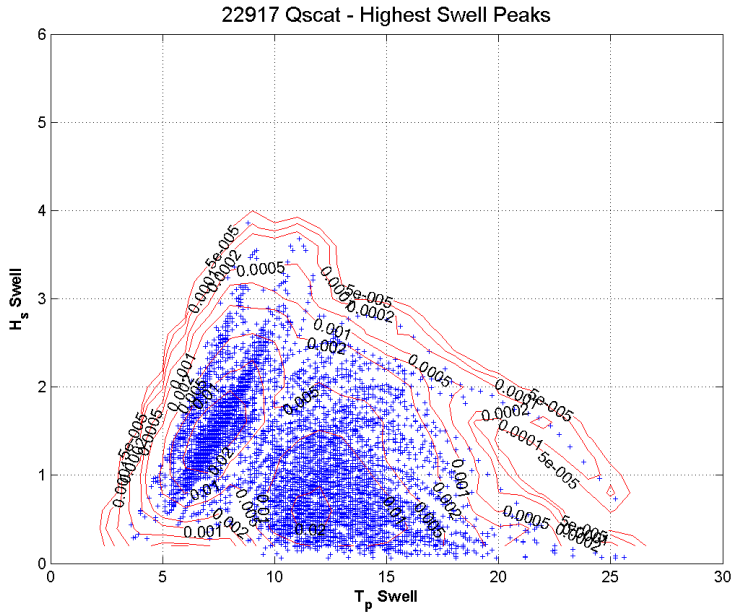
WANE Qscat Data

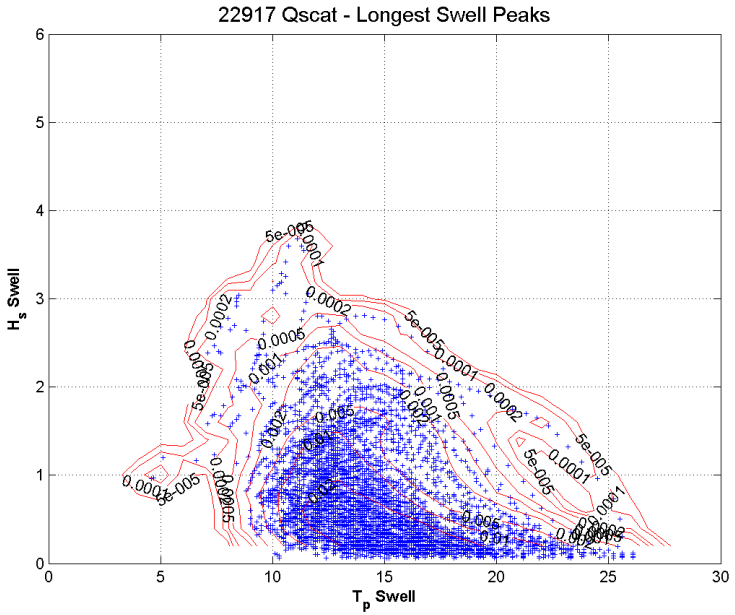

19573 Qscat - All Swell Peaks
H_s Swell
T_p Swell

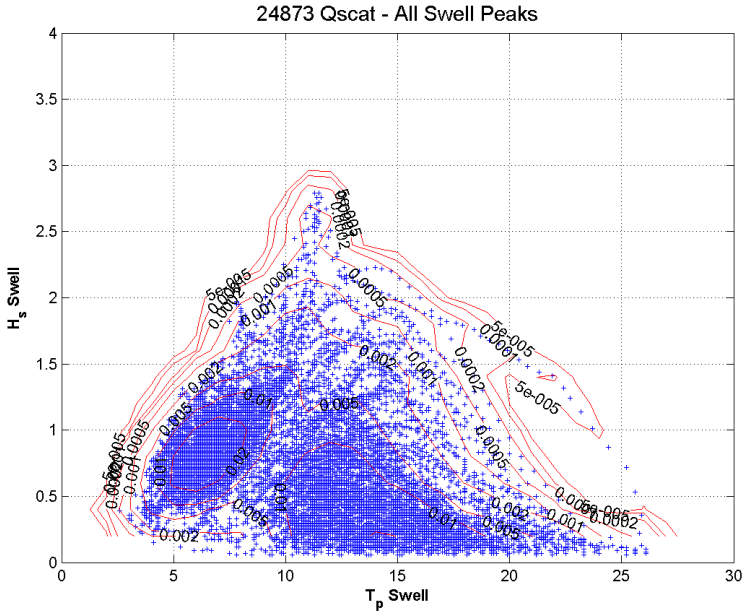

19573 Qscat - Highest Swell Peaks
H_s Swell
T_p Swell

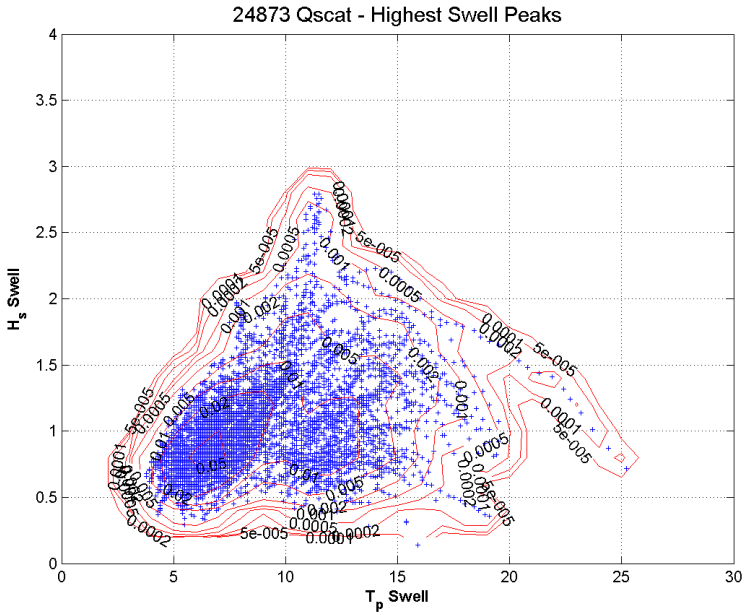

19573 Qscat - Longest Swell Peaks
H_s Swell
T_p Swell

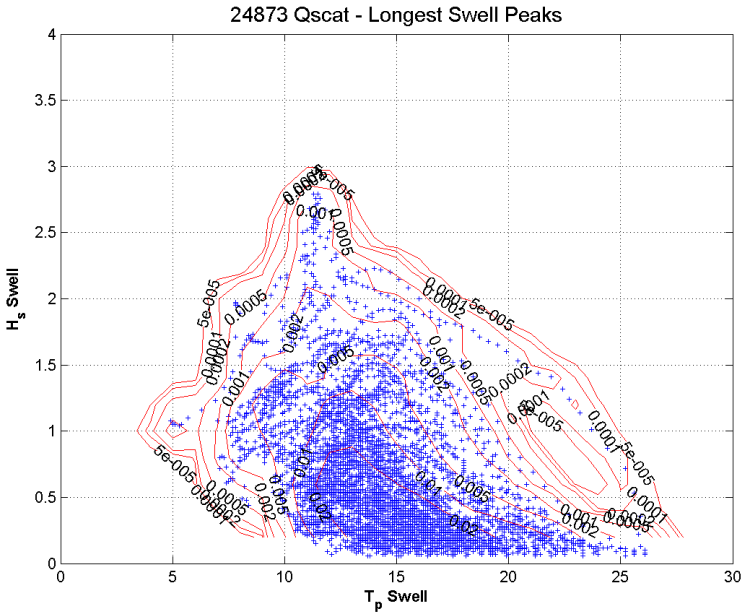

22917 Qscat - All Swell Peaks
H_s Swell
T_p Swell

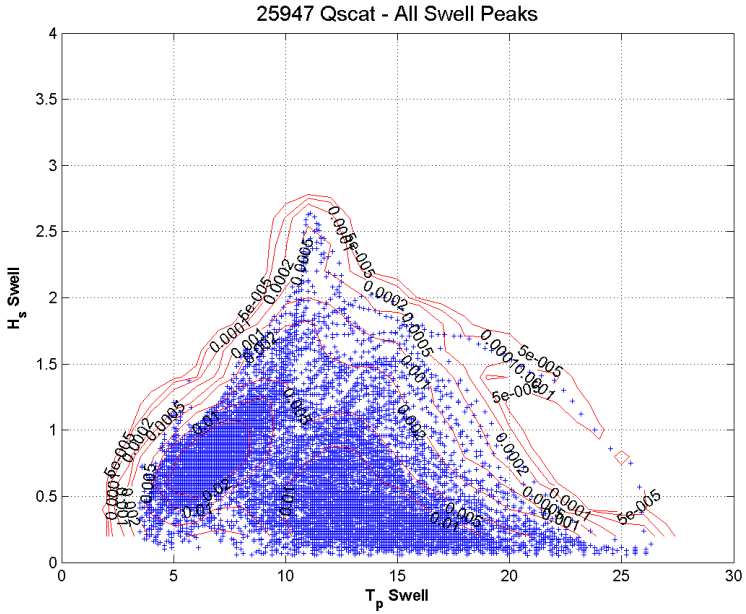

22917 Qscat - Highest Swell Peaks
H_s Swell
T_p Swell

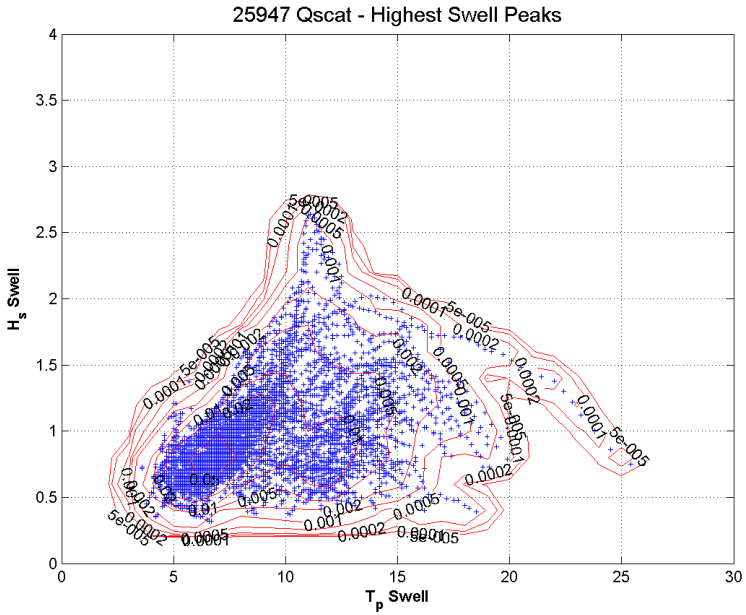

22917 Qscat - Longest Swell Peaks
H_s Swell
T_p Swell

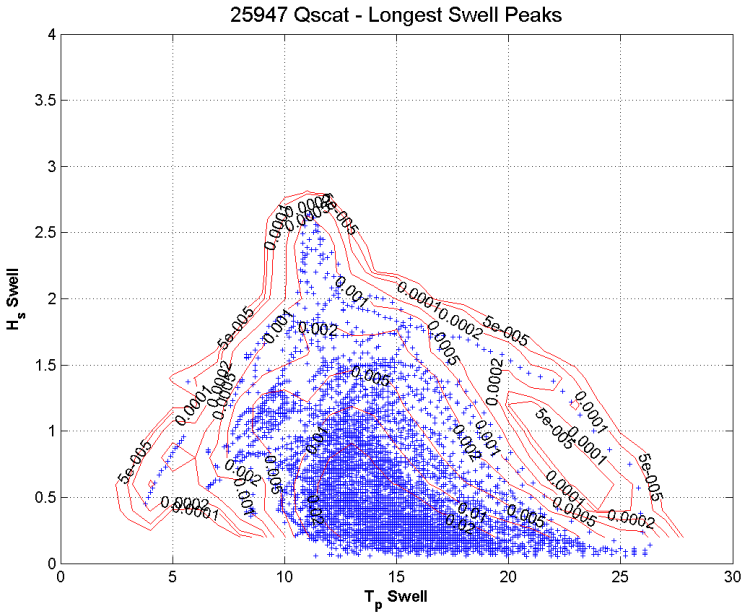

24873 Qscat - All Swell Peaks
H_s Swell
T_p Swell

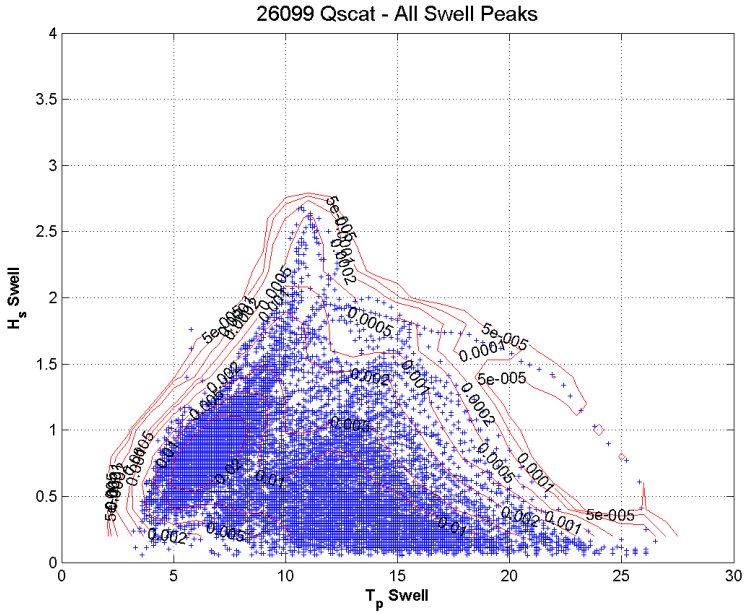

24873 Qscat - Highest Swell Peaks
H_s Swell
T_p Swell

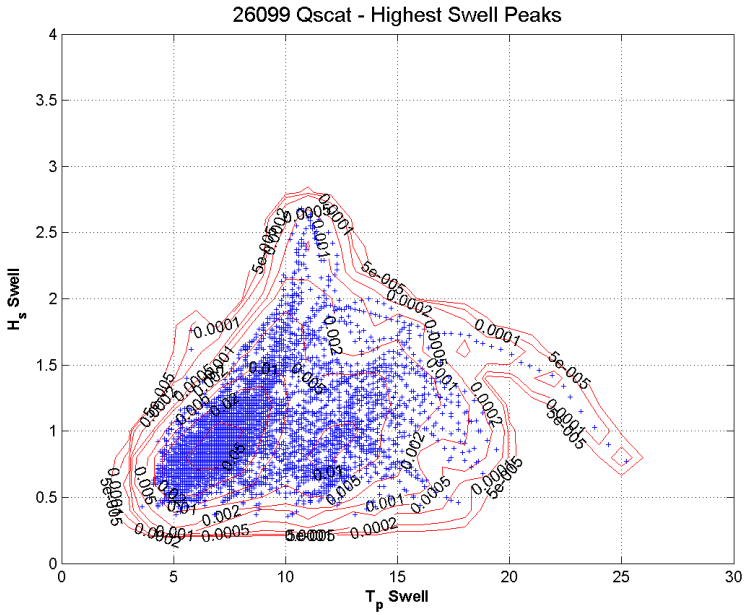

24873 Qscat - Longest Swell Peaks
H_s Swell
T_p Swell

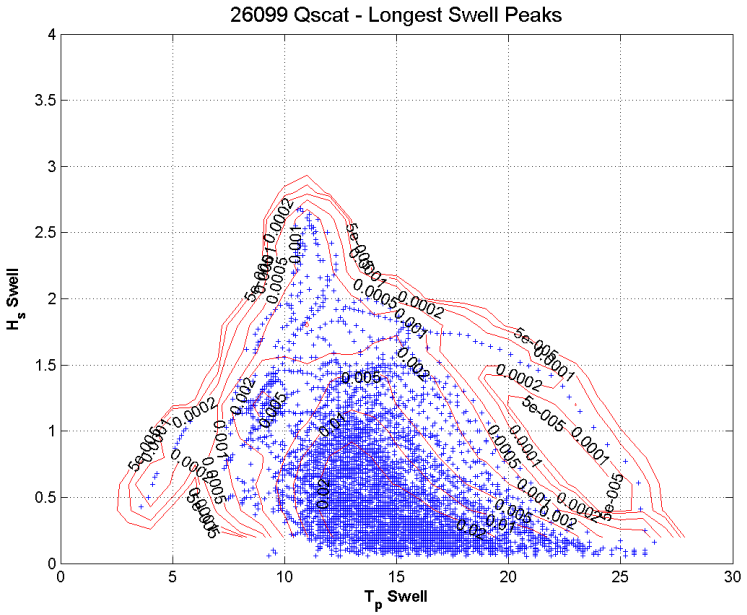

25947 Qscat - All Swell Peaks
H_s Swell
T_p Swell

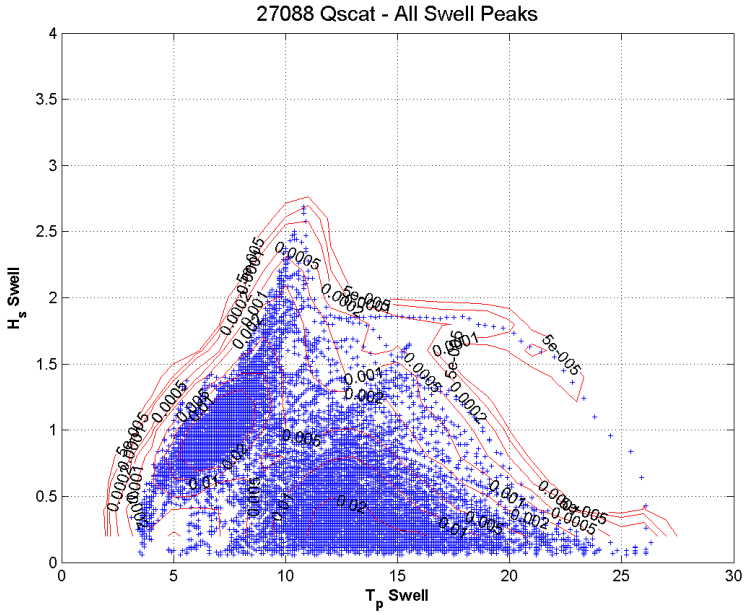

25947 Qscat - Highest Swell Peaks
H_s Swell
T_p Swell

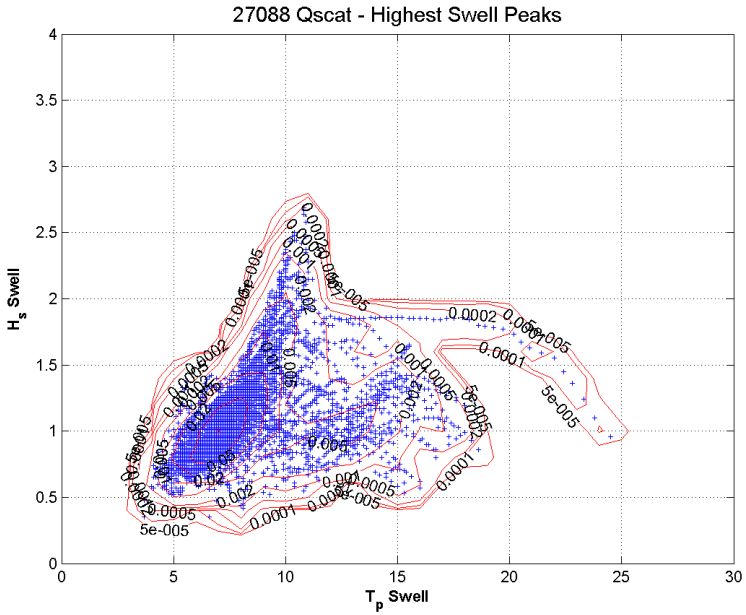

25947 Qscat - Longest Swell Peaks
H_s Swell
T_p Swell

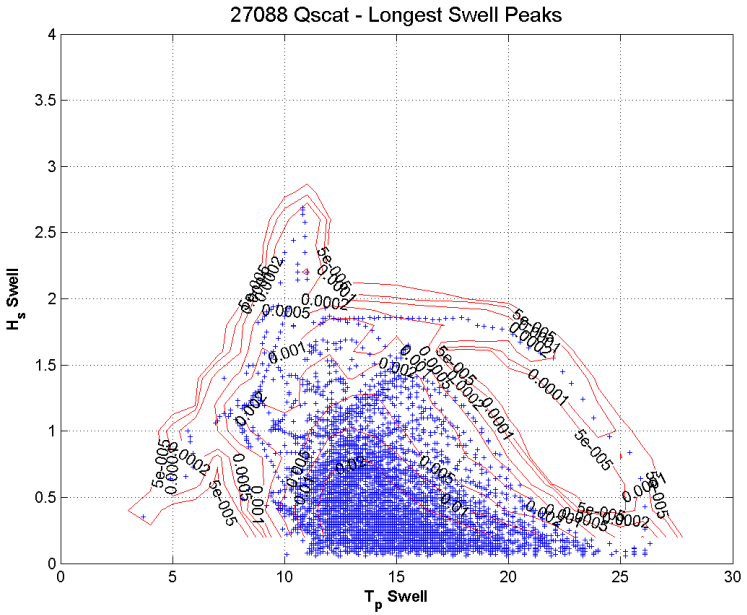

26099 Qscat - All Swell Peaks
H_s Swell
T_p Swell

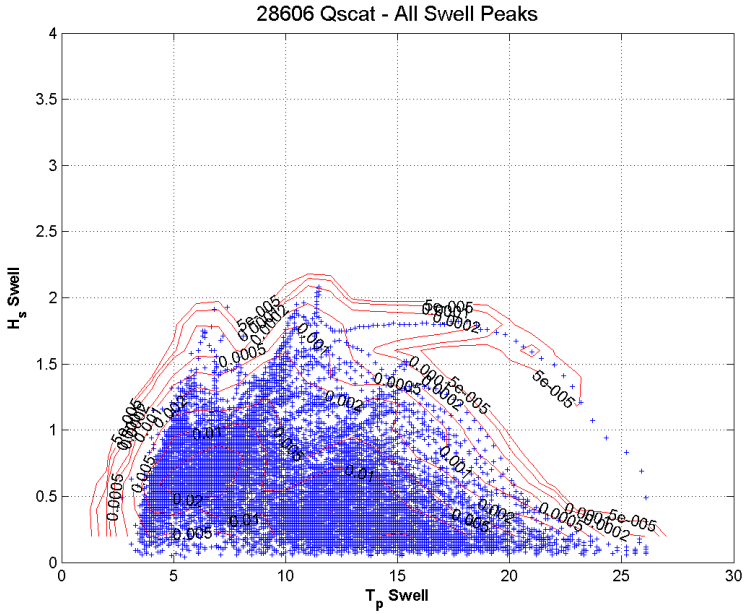

26099 Qscat - Highest Swell Peaks
H_s Swell
T_p Swell

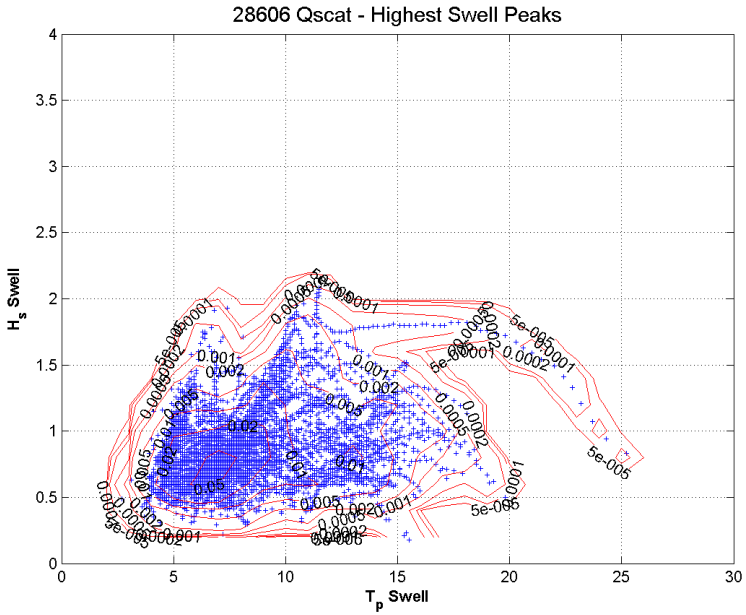

26099 Qscat - Longest Swell Peaks
H_s Swell
T_p Swell

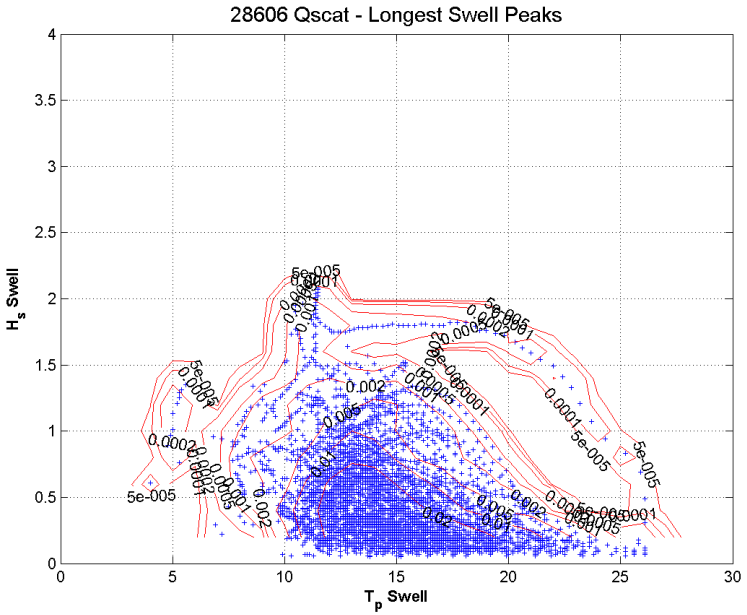

27088 Qscat - All Swell Peaks
H_s Swell
T_p Swell

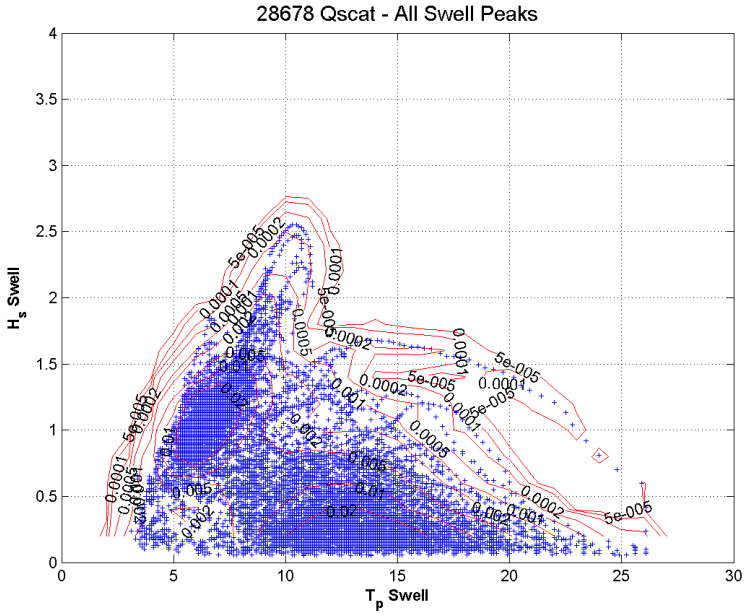

27088 Qscat - Highest Swell Peaks
H_s Swell
T_p Swell

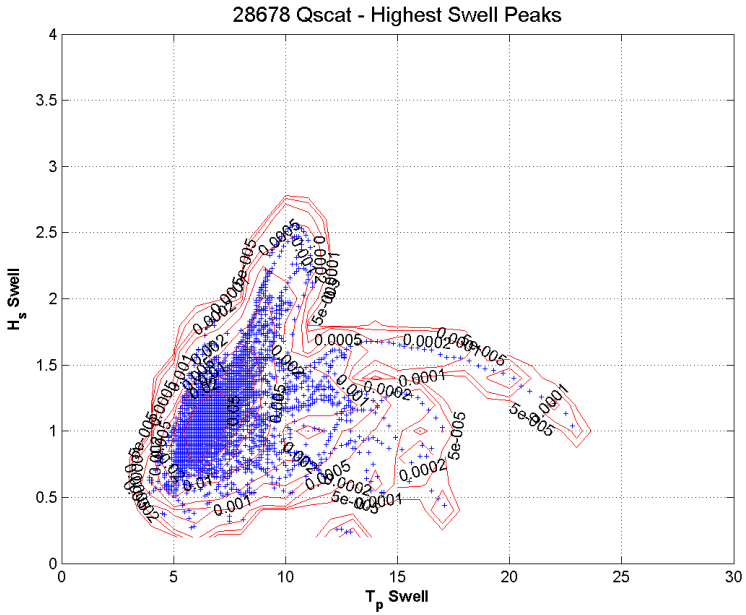

27088 Qscat - Longest Swell Peaks
H_s Swell
T_p Swell

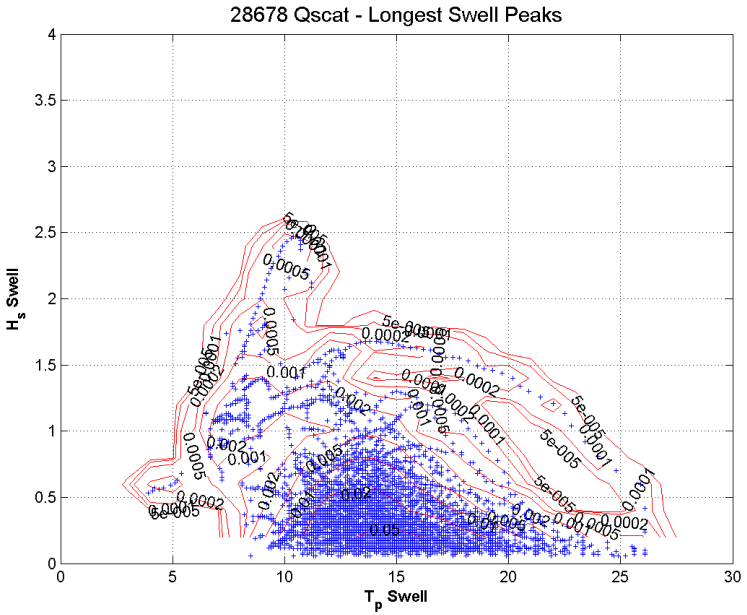

28606 Qscat - All Swell Peaks
H_s Swell
T_p Swell

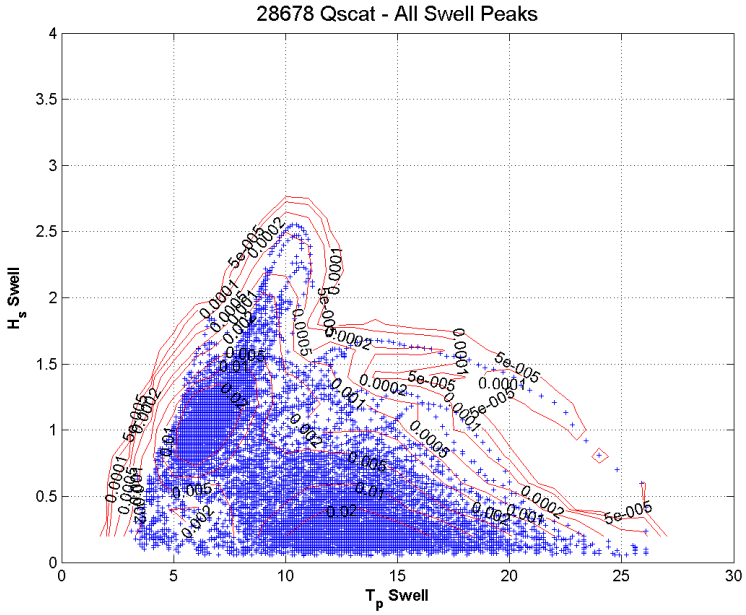

28606 Qscat - Highest Swell Peaks
H_s Swell
T_p Swell

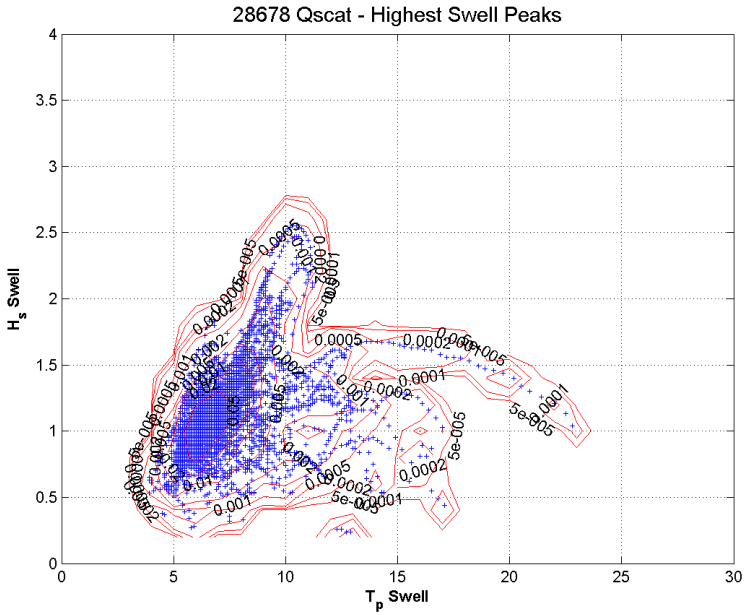

28606 Qscat - Longest Swell Peaks
H_s Swell
T_p Swell

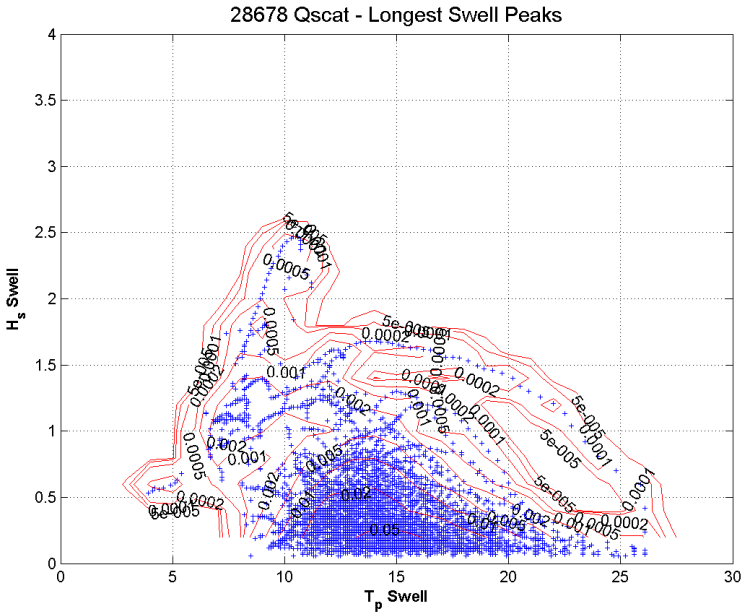

28678 Qscat - All Swell Peaks
H_s Swell
T_p Swell

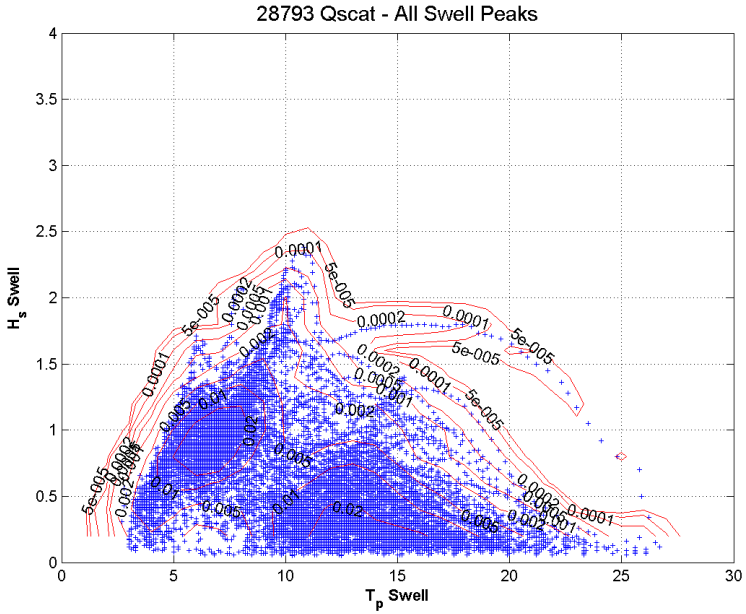

28678 Qscat - Highest Swell Peaks
H_s Swell
T_p Swell

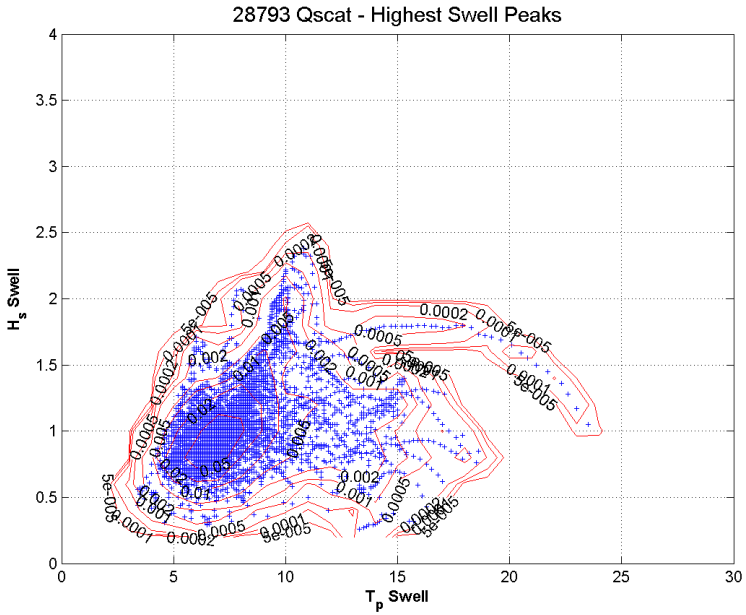

28678 Qscat - Longest Swell Peaks
H_s Swell
T_p Swell

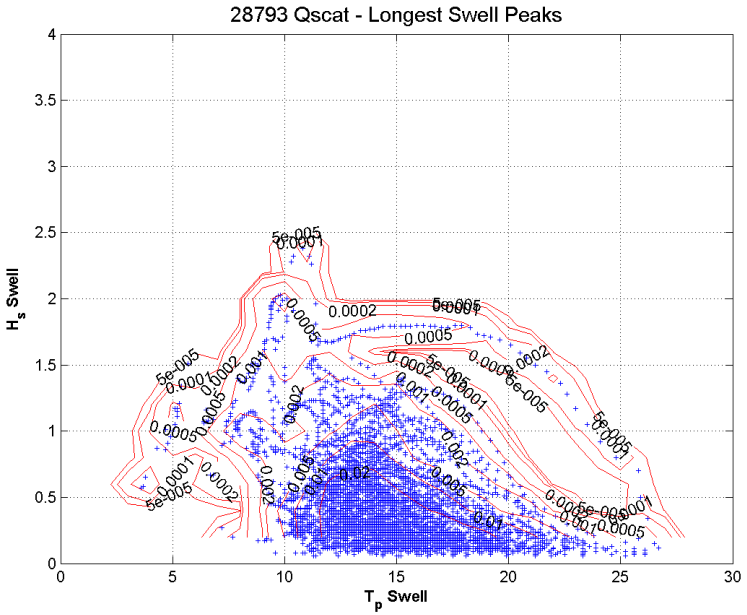

28678 Qscat - All Swell Peaks
H_s Swell
T_p Swell


28678 Qscat - Highest Swell Peaks
H_s Swell
T_p Swell


28678 Qscat - Longest Swell Peaks
H_s Swell
T_p Swell


28793 Qscat - All Swell Peaks
H_s Swell
T_p Swell

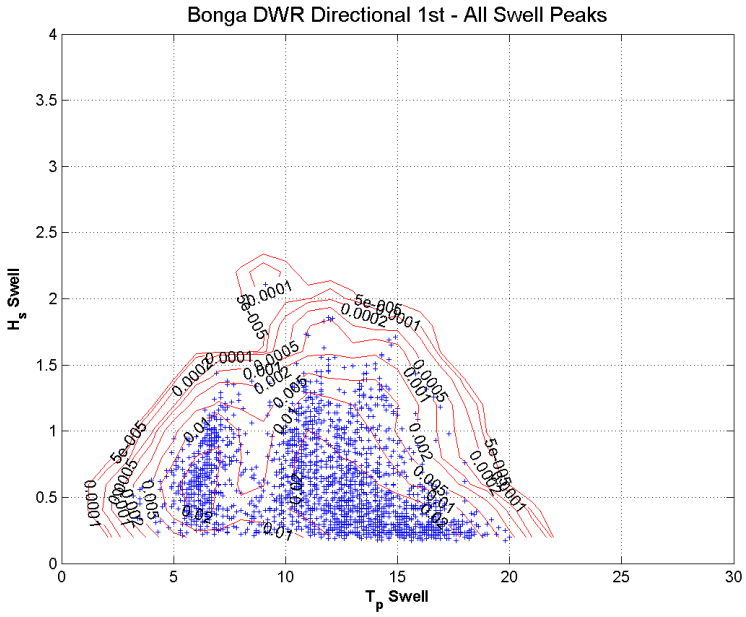

28793 Qscat - Highest Swell Peaks
H_s Swell
T_p Swell

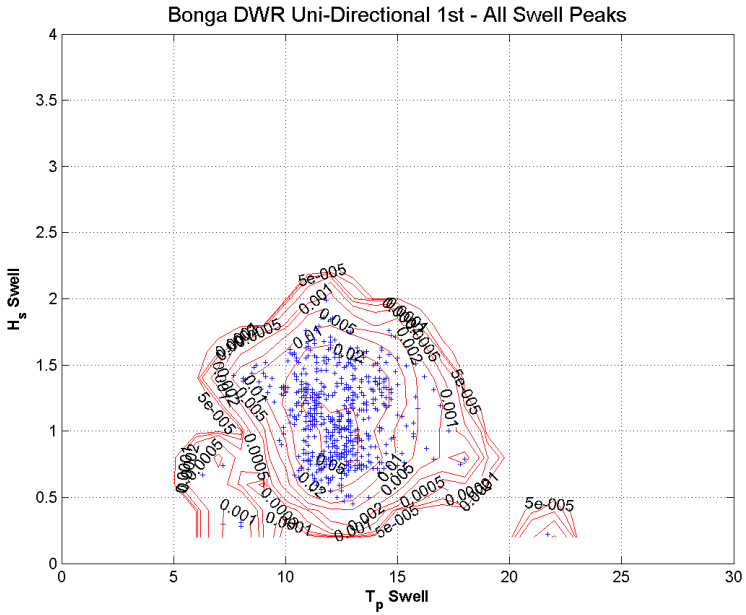

28793 Qscat - Longest Swell Peaks
H_s Swell
T_p Swell

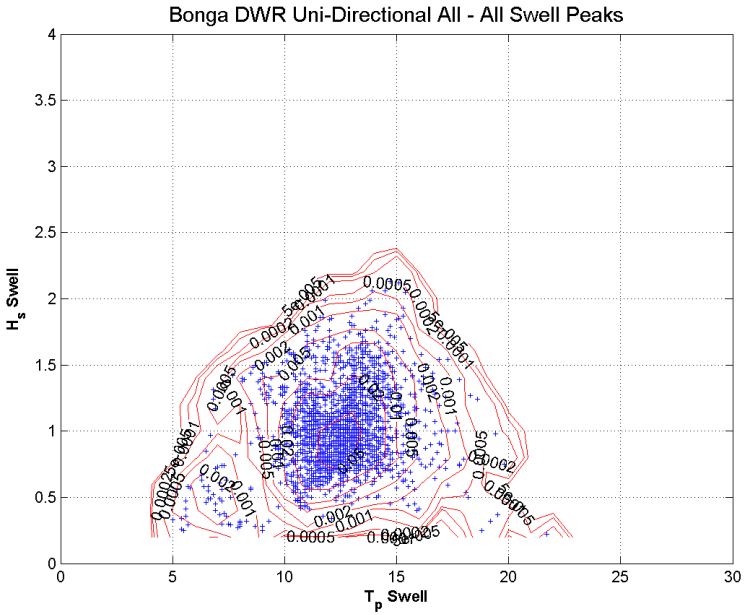
Appendix 8.4

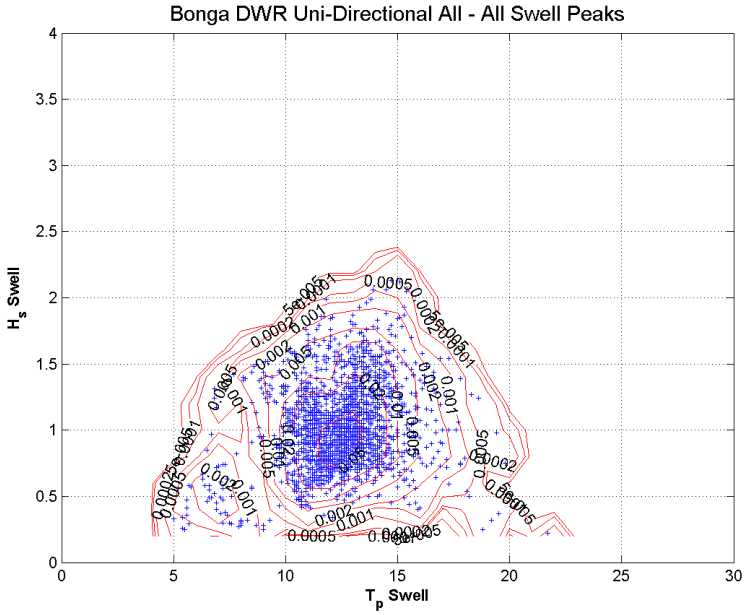
Kernel Density Estimates for Partitioned Wave Height and Period

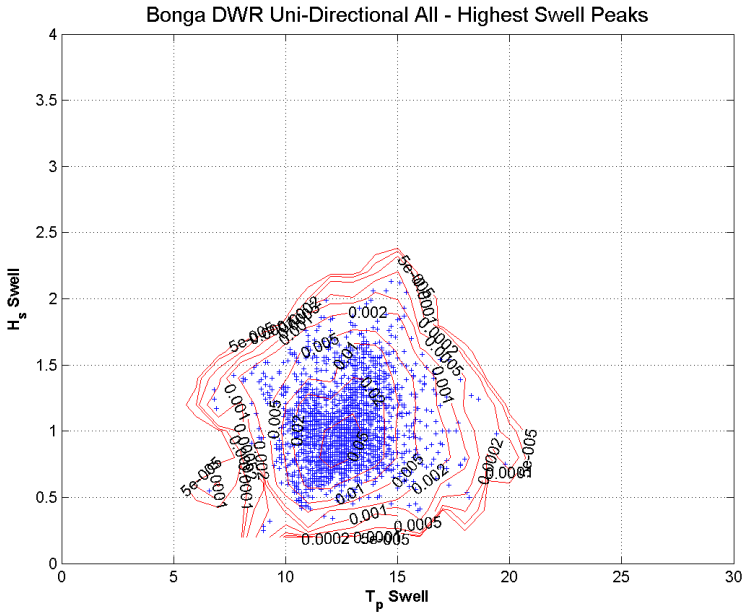
Measured Data

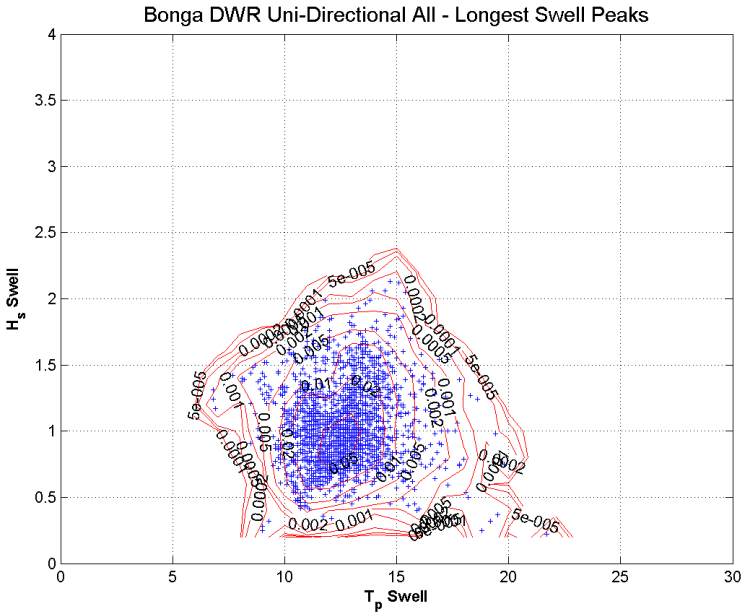

Bonga DWR Directional 1st - All Swell Peaks
H_s Swell
T_p Swell

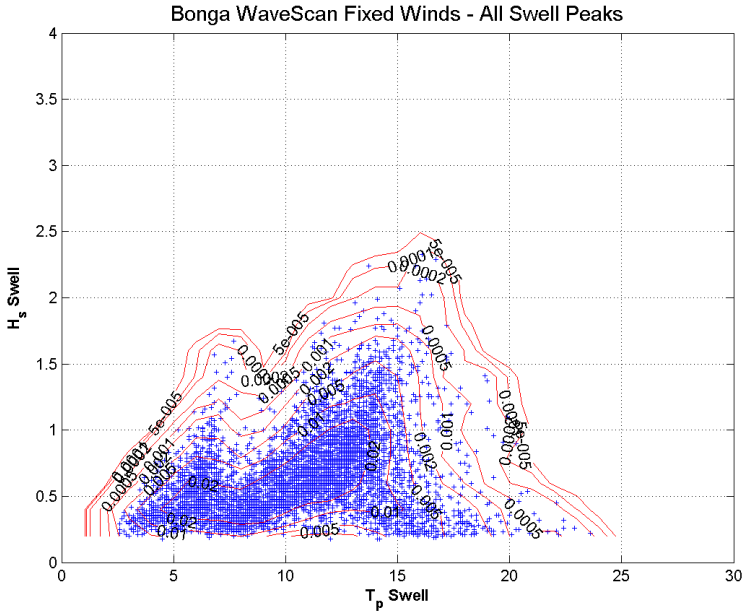

Bonga DWR Uni-Directional 1st - All Swell Peaks
H_s Swell
T_p Swell

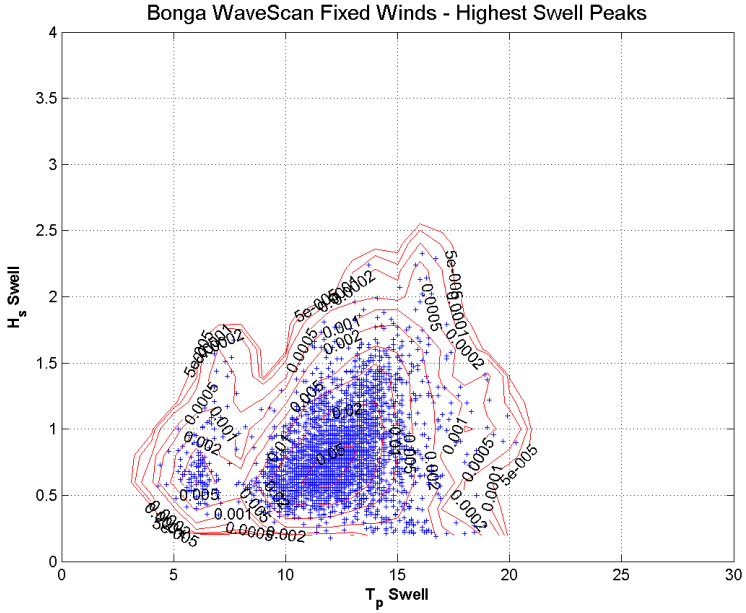

Bonga DWR Uni-Directional All - All Swell Peaks
H_s Swell
T_p Swell

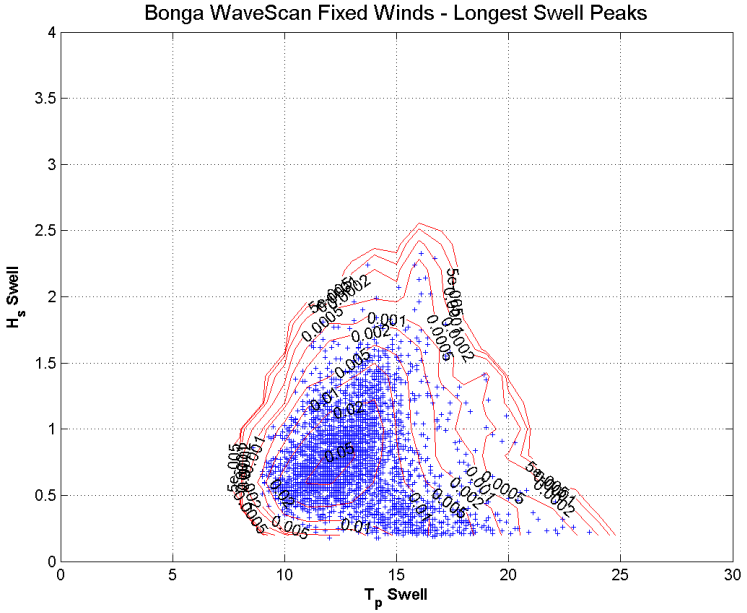

Bonga DWR Uni-Directional All - All Swell Peaks
H_s Swell
T_p Swell

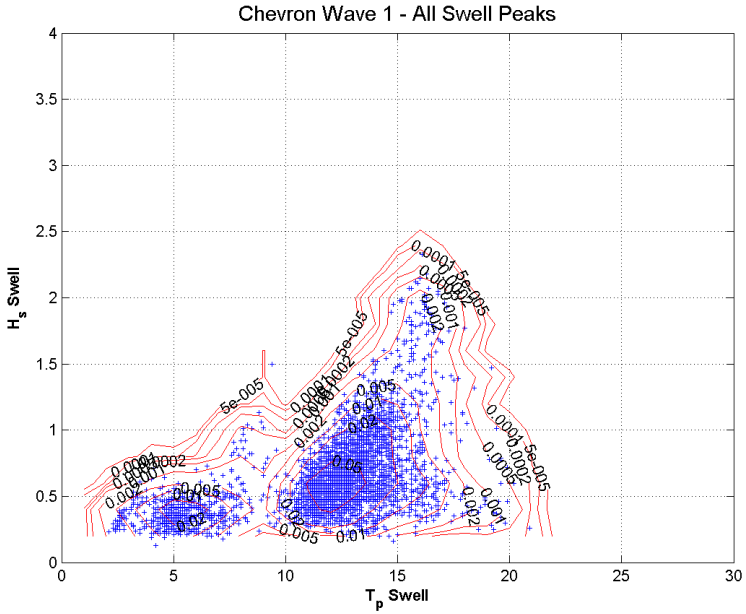

Bonga DWR Uni-Directional All - Highest Swell Peaks
H_s Swell
T_p Swell

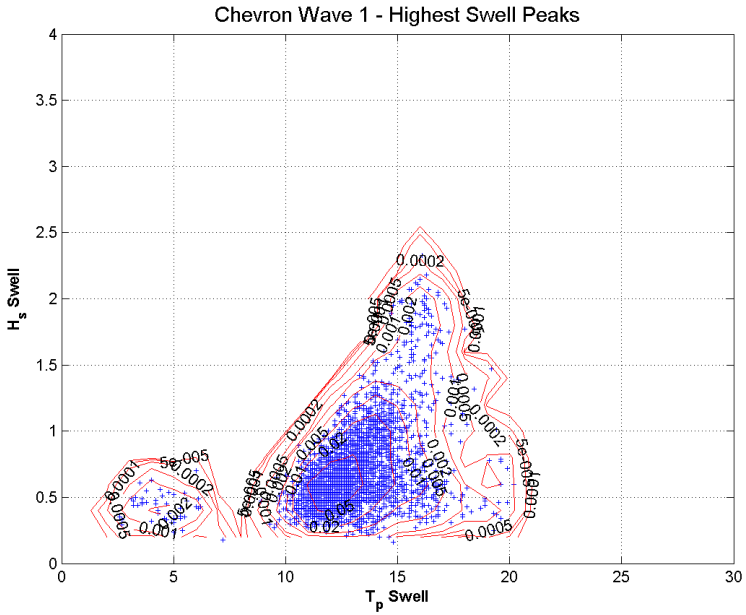

Bonga DWR Uni-Directional All - Longest Swell Peaks
H_s Swell
T_p Swell

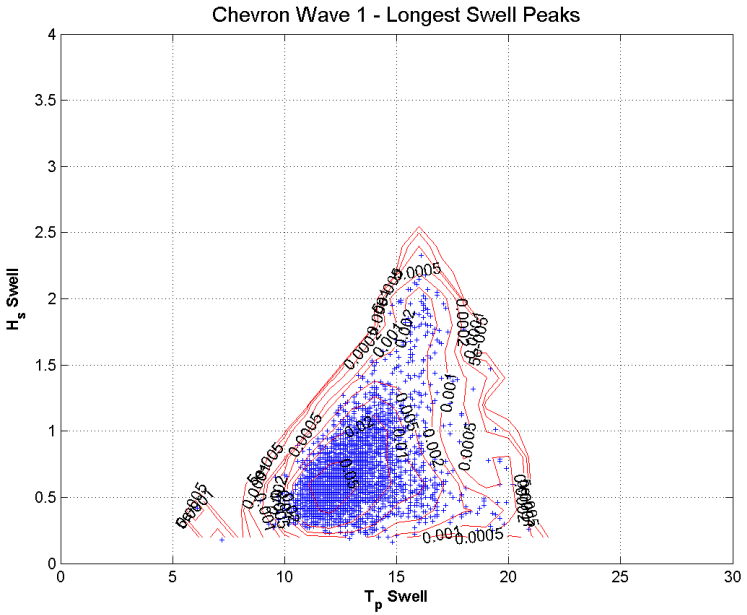

Bonga WaveScan Fixed Winds - All Swell Peaks
H_s Swell
T_p Swell

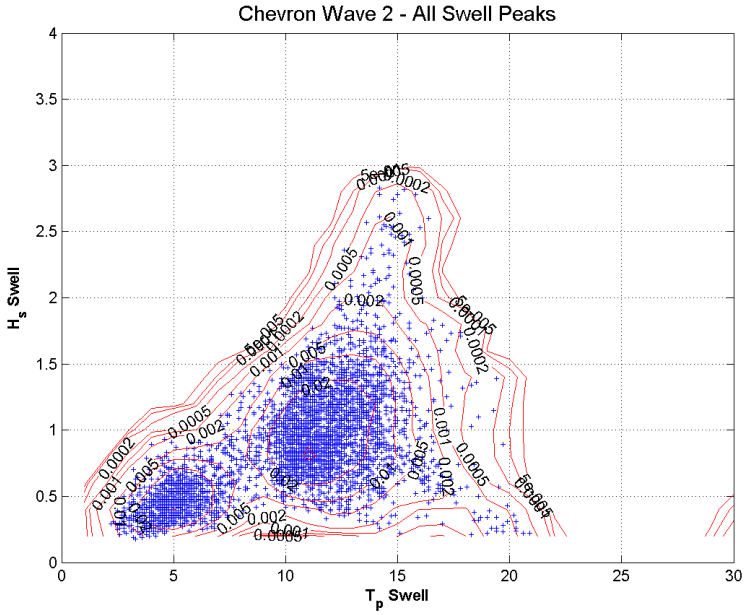

Bonga WaveScan Fixed Winds - Highest Swell Peaks
H_s Swell
T_p Swell

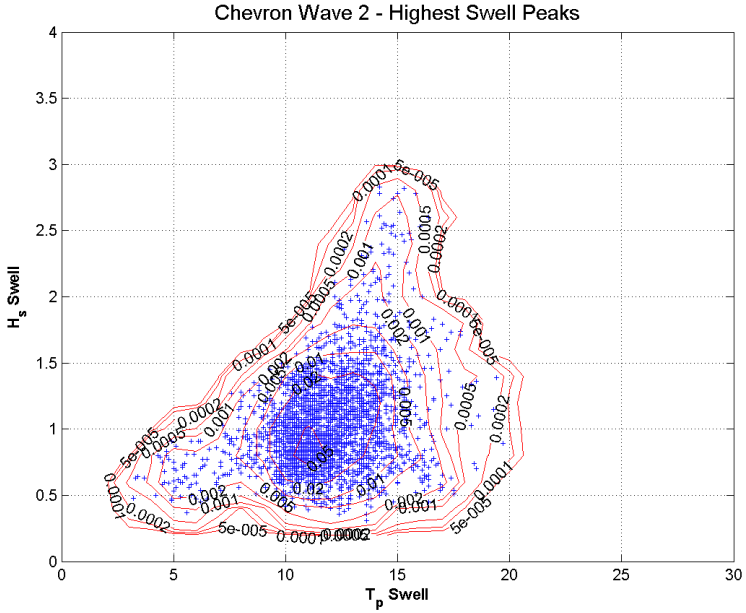

Bonga WaveScan Fixed Winds - Longest Swell Peaks
H_s Swell
T_p Swell

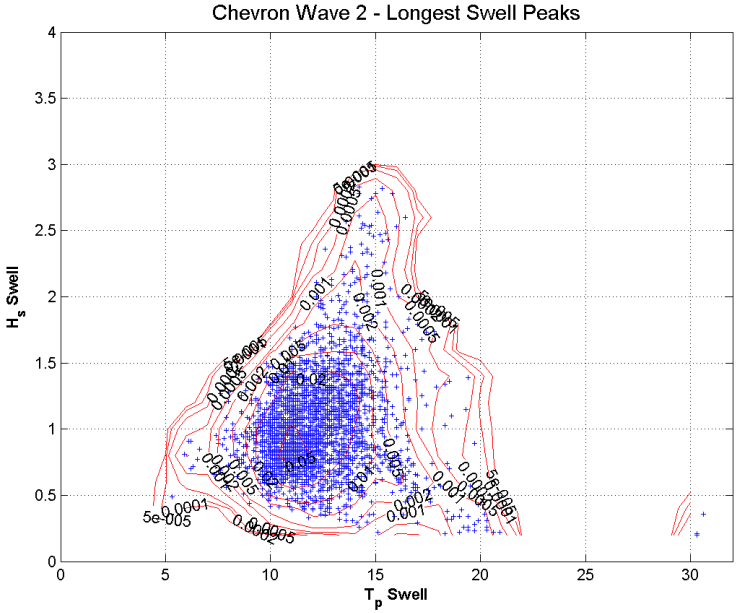

Chevron Wave 1 - All Swell Peaks
H_s Swell
T_p Swell

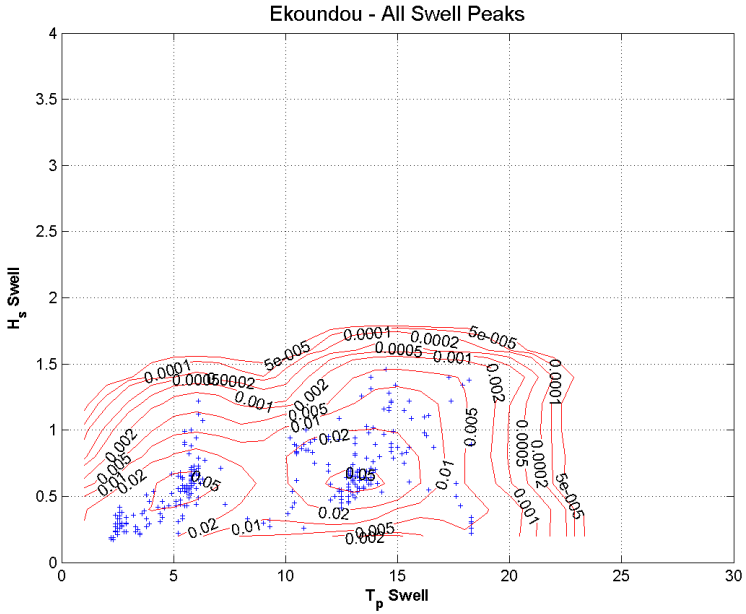

Chevron Wave 1 - Highest Swell Peaks
H_s Swell
T_p Swell

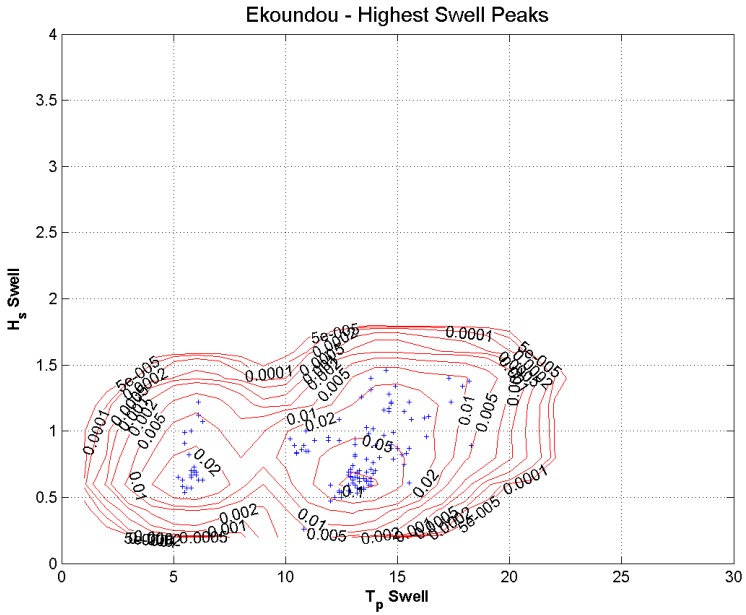

Chevron Wave 1 - Longest Swell Peaks
H_s Swell
T_p Swell

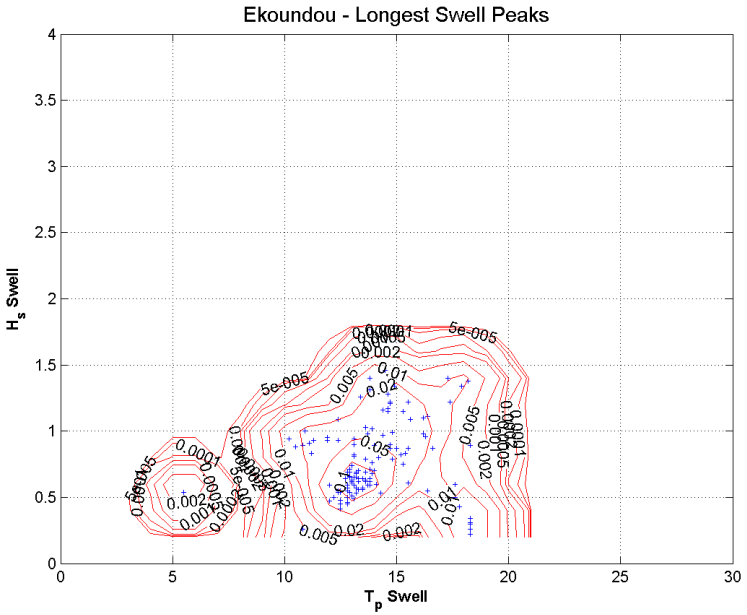

Chevron Wave 2 - All Swell Peaks
H_s Swell
T_p Swell

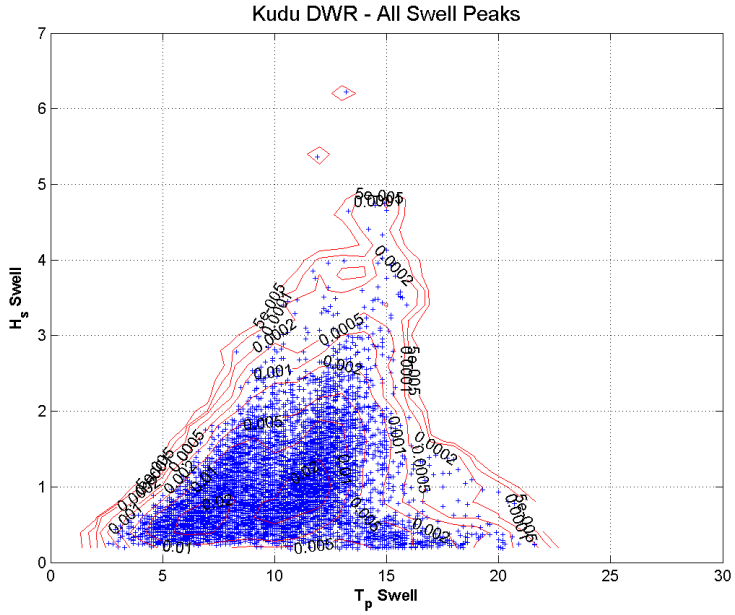

Chevron Wave 2 - Highest Swell Peaks
H_s Swell
T_p Swell

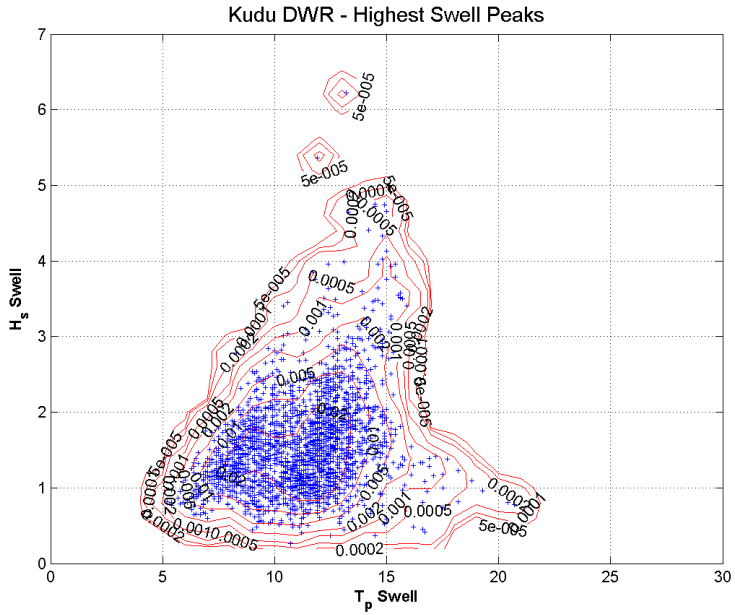

Chevron Wave 2 - Longest Swell Peaks
H_s Swell
T_p Swell

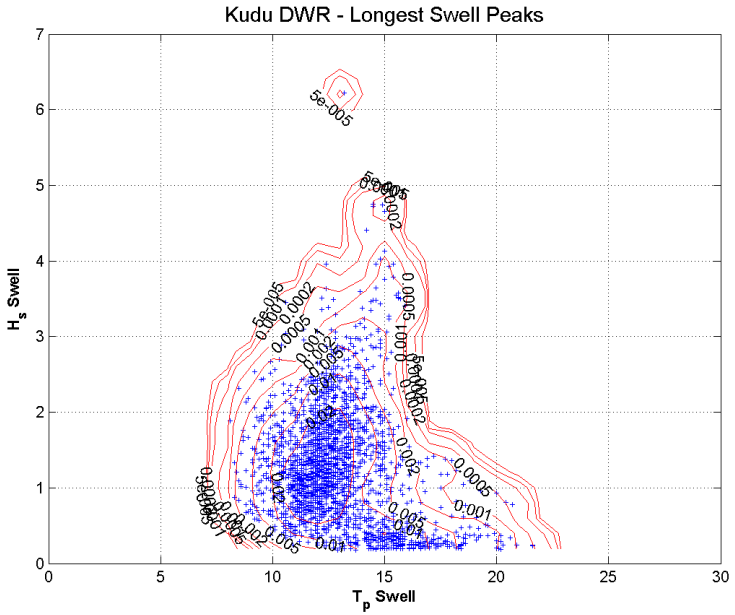

Ekoundou - All Swell Peaks
H_s Swell
T_p Swell


Ekoundou - Highest Swell Peaks
H_s Swell
T_p Swell


Ekoundou - Longest Swell Peaks
H_s Swell
T_p Swell


Kudu DWR - All Swell Peaks
H_s Swell
T_p Swell

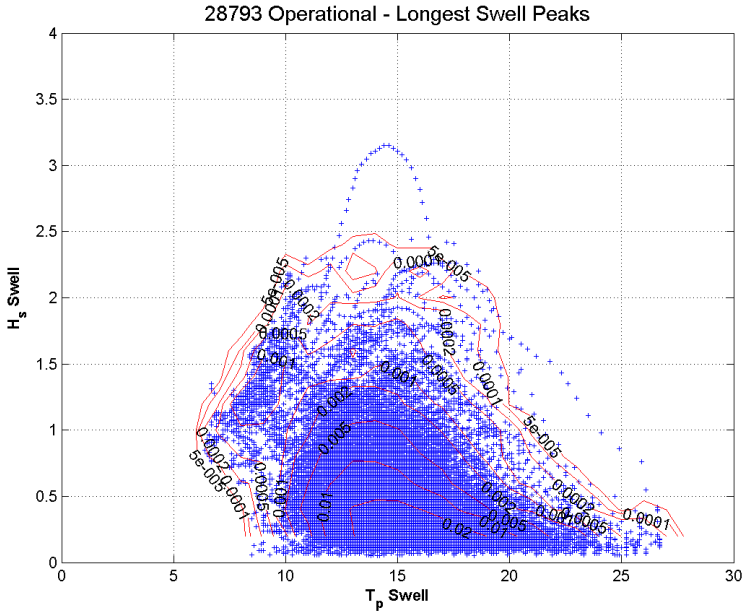

Kudu DWR - Highest Swell Peaks
H_s Swell
T_p Swell

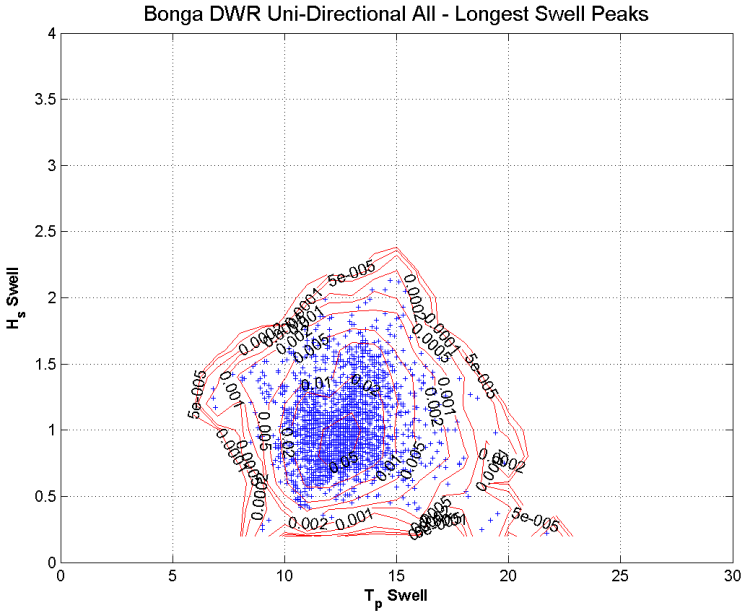

Kudu DWR - Longest Swell Peaks
H_s Swell
T_p Swell

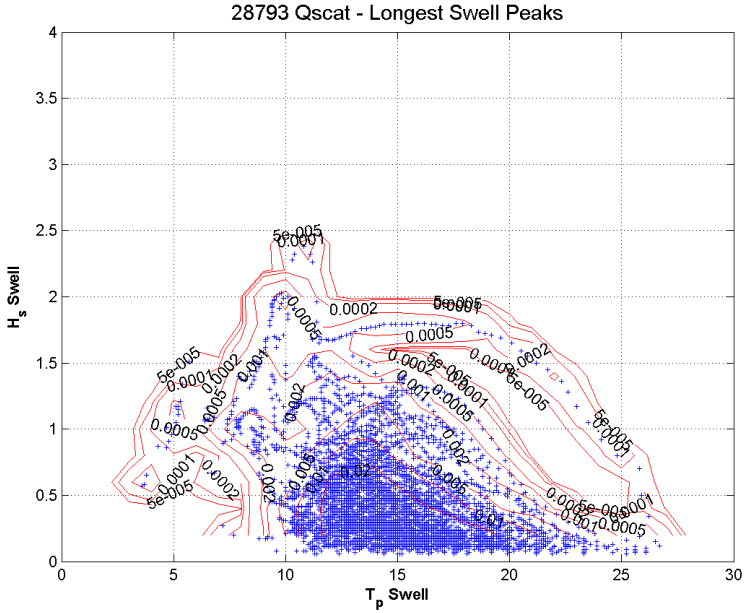
Appendix 8.5

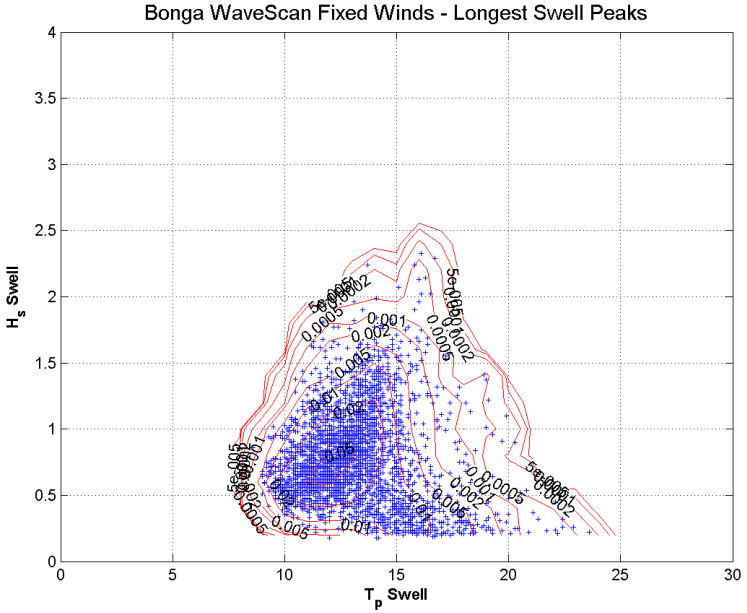
Kernel Density Estimates for Partitioned Wave Height and Period

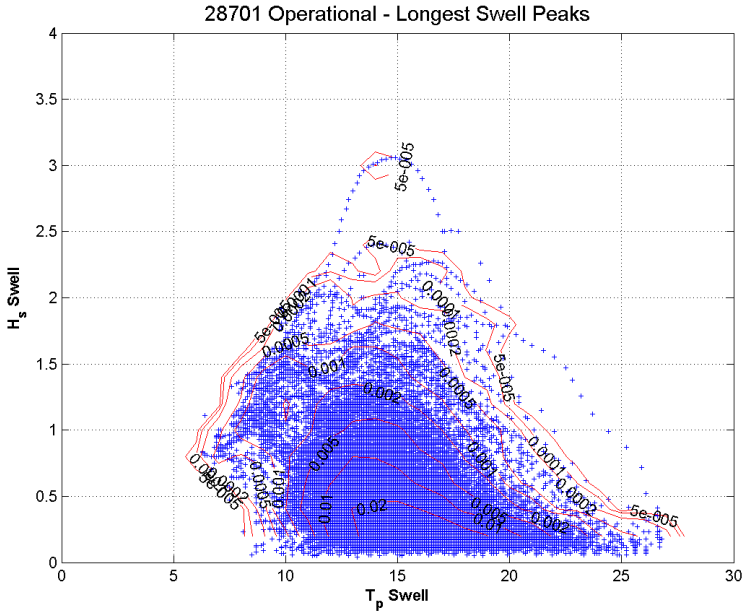
Comparison of WANE and Measured Data

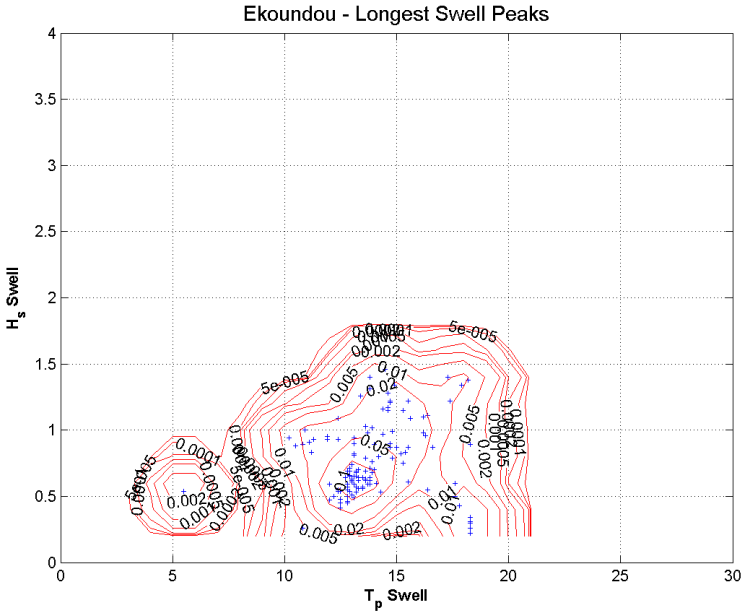

28793 Operational - Longest Swell Peaks
H_s Swell
T_p Swell

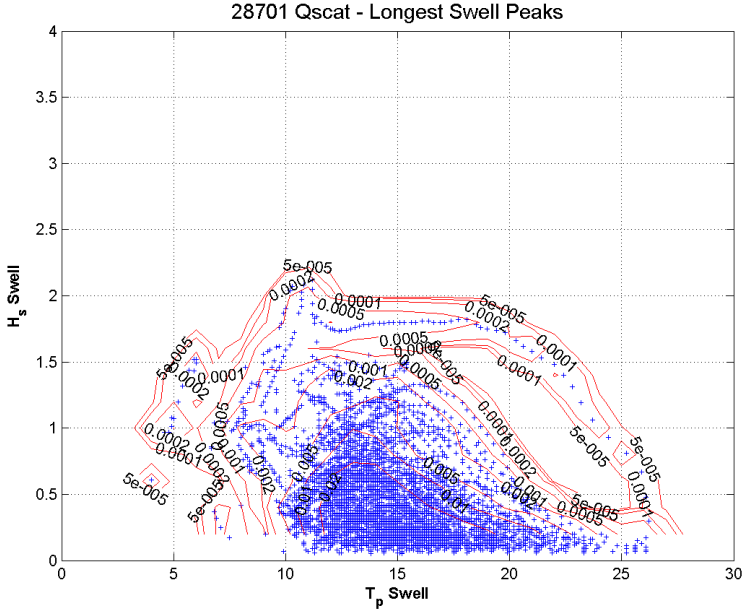

Bonga DWR Uni-Directional All - Longest Swell Peaks
H_s Swell
T_p Swell

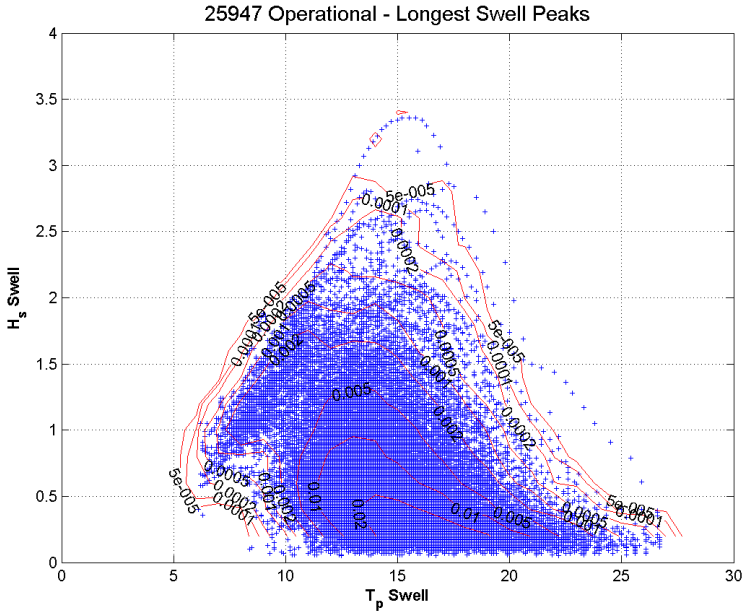

28793 Qscat - Longest Swell Peaks
H_s Swell
T_p Swell

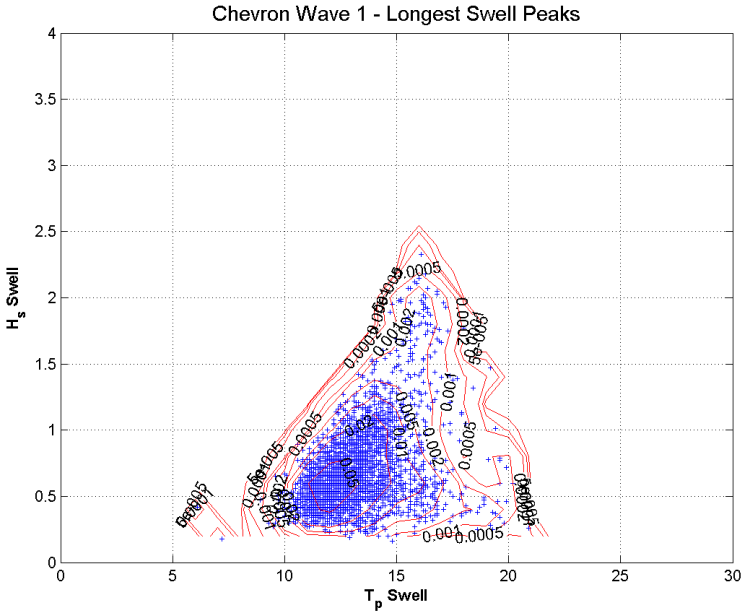

Bonga WaveScan Fixed Winds - Longest Swell Peaks
H_s Swell
T_p Swell

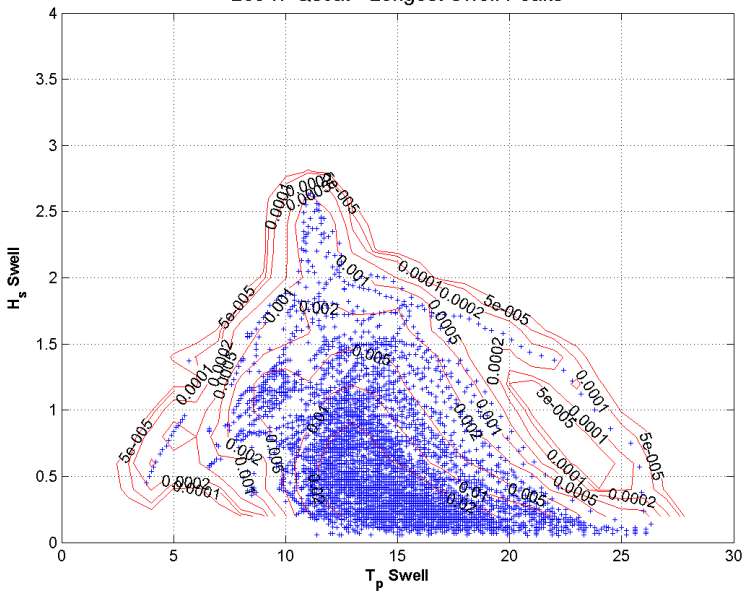

28701 Operational - Longest Swell Peaks
H_s Swell
T_p Swell

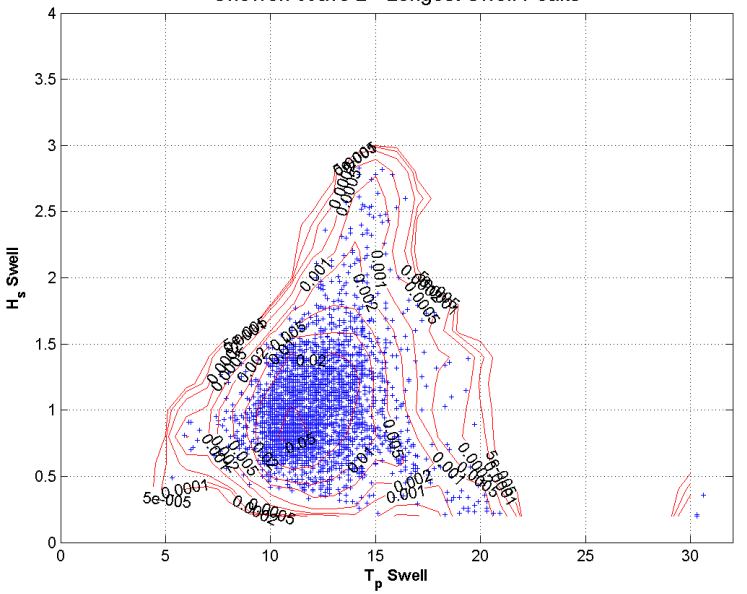

Ekoundou - Longest Swell Peaks
H_s Swell
T_p Swell

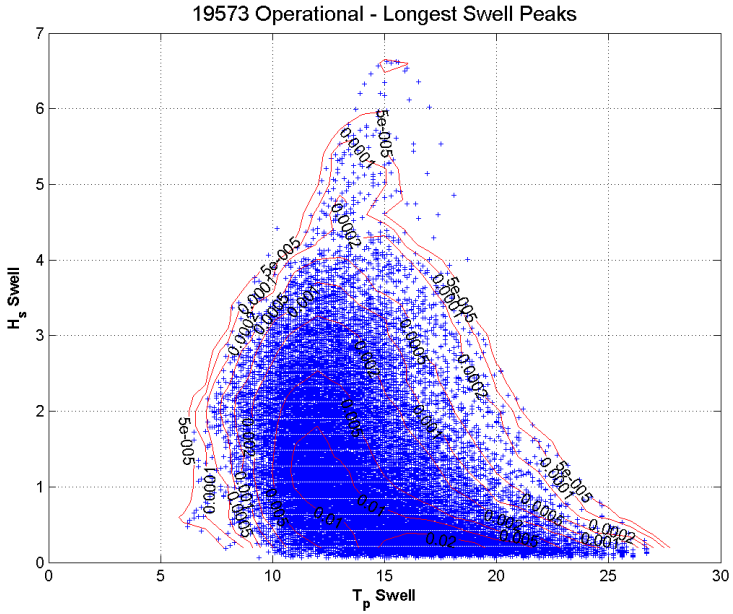

28701 Qscat - Longest Swell Peaks
H_s Swell
T_p Swell

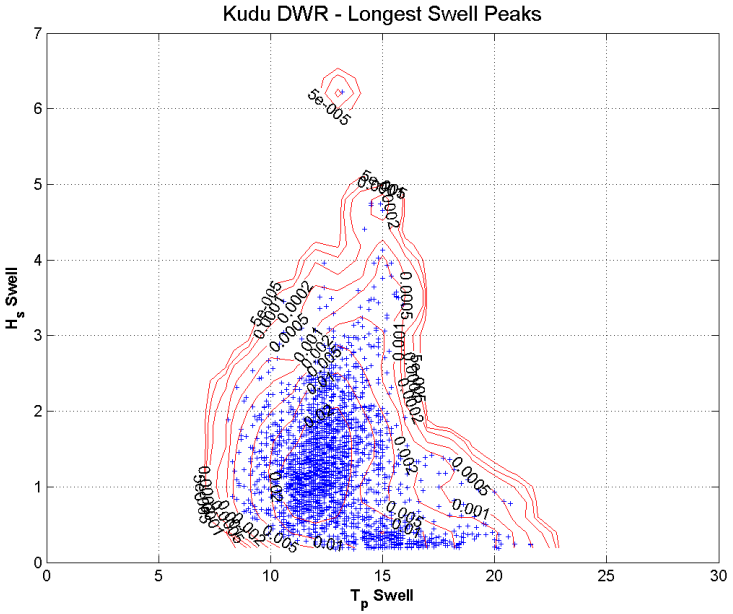

25947 Operational - Longest Swell Peaks
H_s Swell
T_p Swell

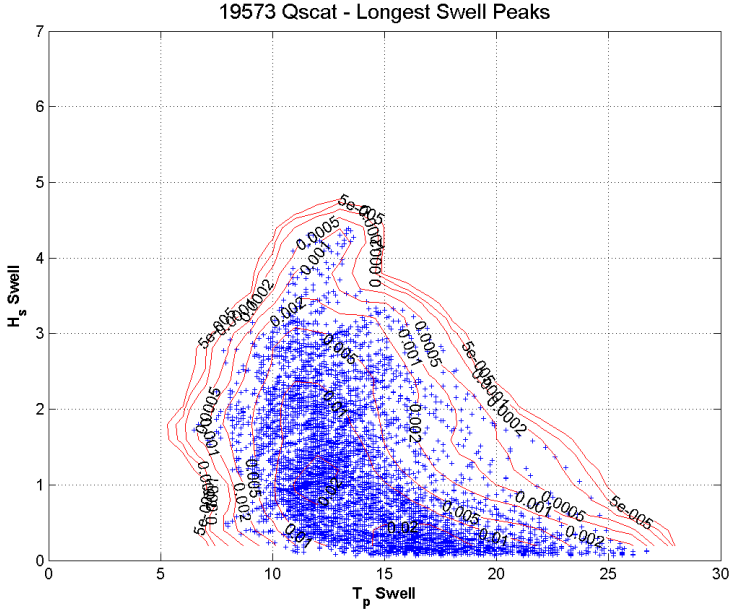

Chevron Wave 1 - Longest Swell Peaks
H_s Swell
T_p Swell


25947 Qscat - Longest Swell Peaks
H_s Swell
T_p Swell


Chevron Wave 2 - Longest Swell Peaks
H_s Swell
T_p Swell


19573 Operational - Longest Swell Peaks
H_s Swell
T_p Swell


Kudu DWR - Longest Swell Peaks
H_s Swell
T_p Swell


19573 Qscat - Longest Swell Peaks
H_s Swell
T_p Swell