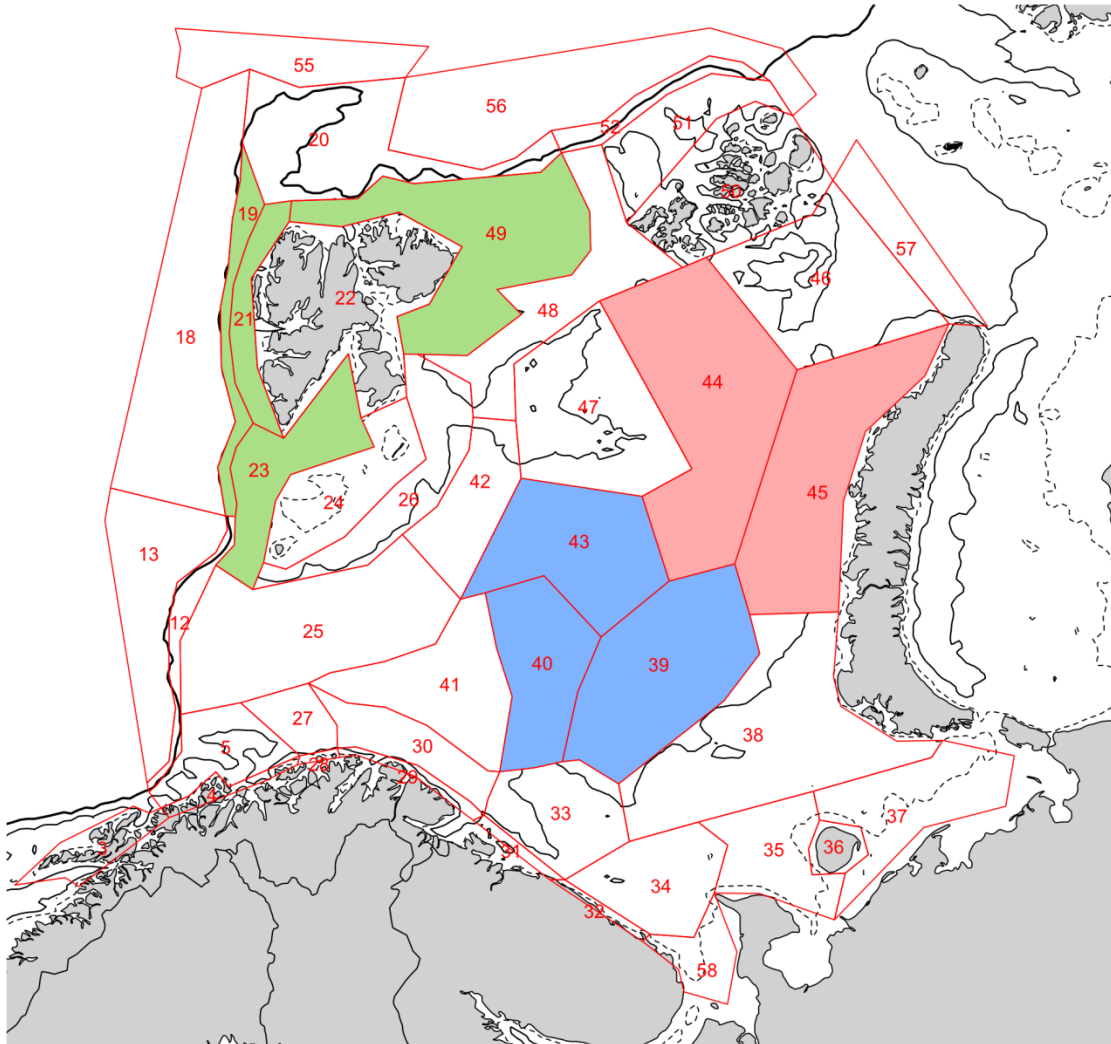


Appendix S4: Species-specific summary of the changes in fish community observed in three selected areas.

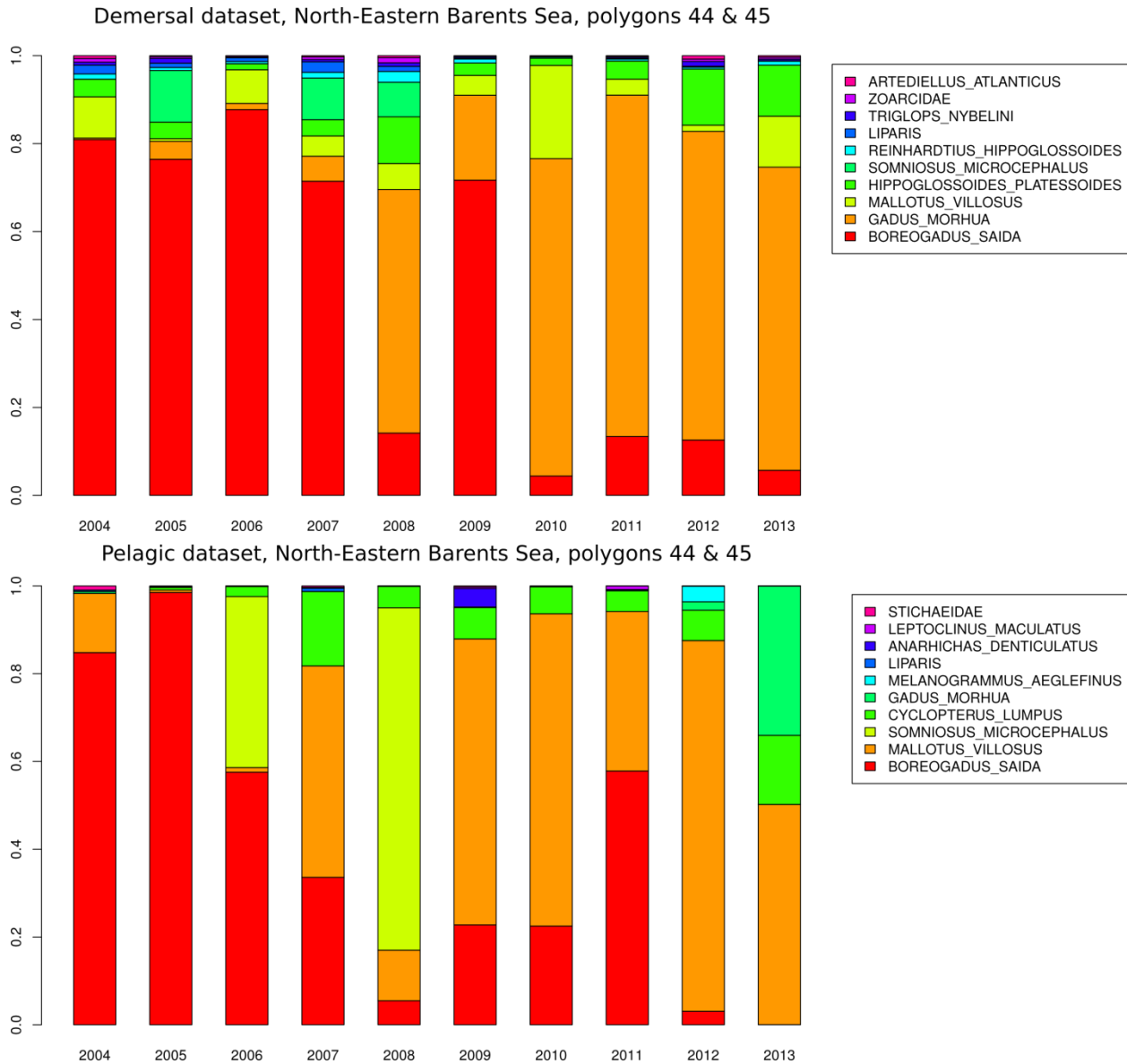
On the basis of our diversity analysis, three areas of particular interest have been delineated: North-East Barents Sea (red polygons 44 & 45), Svalbard surroundings (green polygons 19,21,23 & 49), and Central Barents Sea. (blue polygons 39,40 & 43).



These areas have attracted our interest because of the different temporal variability pattern their fish community has experienced during the 10 years of our survey. We therefore present in the following pages descriptive plots that further illustrate these biodiversity changes at the species level.

Drifting dominance regime – North-Eastern Barents Sea.

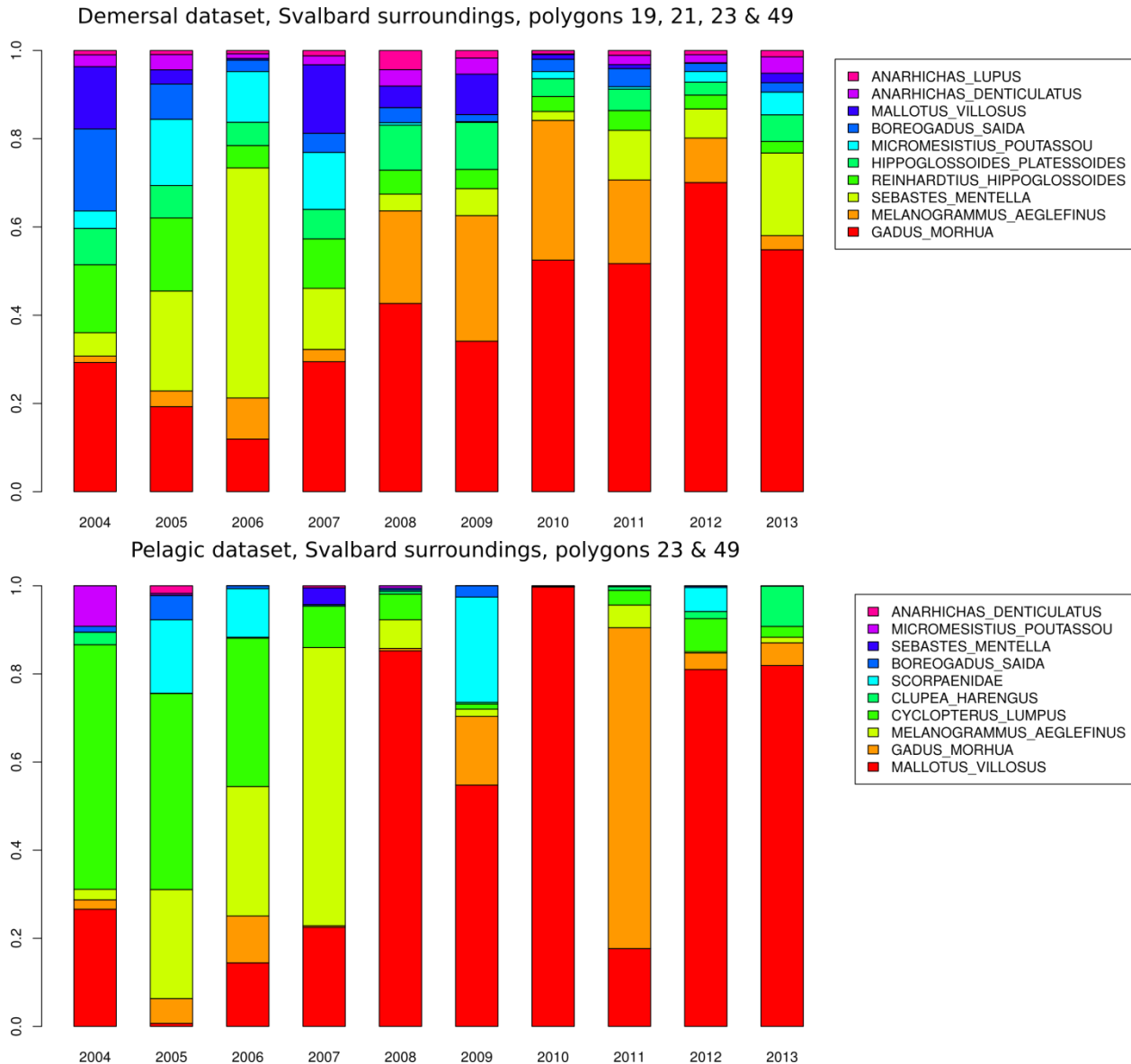
Our analysis on the relationships between β_{2years} and lag time (fig 5 in the manuscript) reveals very high regression slopes in the Eastern part of the Barents Sea at $q=2$, which suggests a major reconfiguration of the dominance regimes. The barplots below summarizes the changes in the 10 most abundant species in this area for both the demersal and the pelagic fish community:



These barplots clearly shows that previously dominant polar cod *Boreogadus saida* in 2004-2007 has been replaced by cod *Gadus morhua* in the demersal dataset, and capelin *Mallotus villosus* in the pelagic dataset. In addition, other species such as the lumpsucker *Cyclopterus lumpus* have been increasingly caught in the late period, while other groups such as snailfishes *Liparis spp.* have been less represented.

High random fluctuations – Svalbard surroundings.

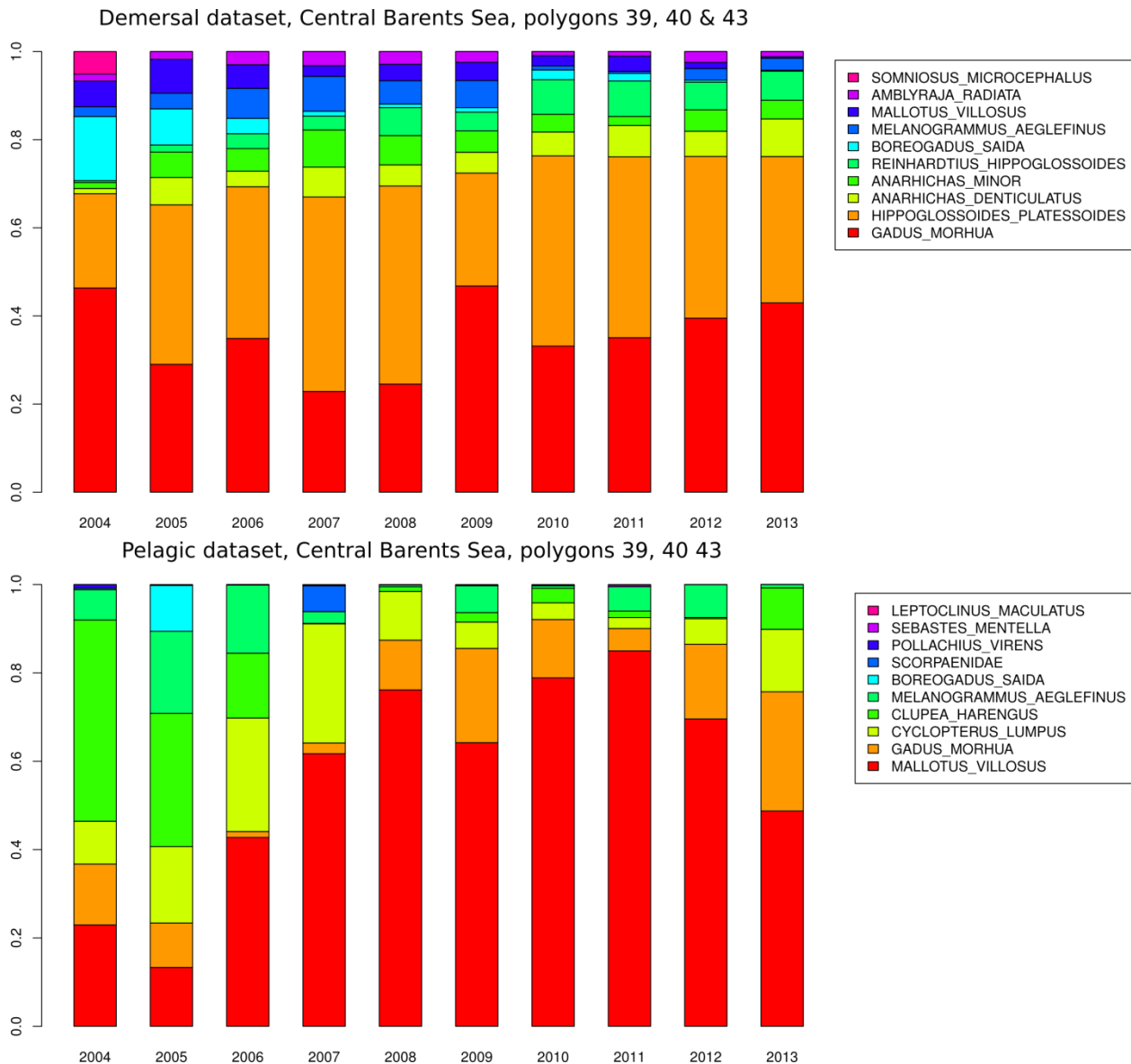
High values of $\beta_{\text{trawl/year}}$ as well β_{year} (fig 3 & 4 in the manuscript) together with higher expected values of $\beta_{2\text{years}}$ at lag-time 1 (fig 5 in the manuscript) all pointed toward high random variations of fish community in the Svalbard surroundings. The barplots below summarizes the changes in the 10 most abundant species in this area for both the demersal and the pelagic fish community:



Some species present highly variable abundances through time in this area. This is the case for cod and capelin, but also for other dominating species such as beaked redfish *Sebastes mentella* and Haddock *Melanogrammus aeglefinus* in the demersal dataset, or herring *Clupea Harengus* in the pelagic dataset. All display short periods (1-4 years) of high abundances at different times, which might be due to either high recruitment or migration. Also, cod and capelin have been increasingly important over the years, and are responsible for the high drift coefficient noted in polygon 49 (fig 5, appendix S3) in both the demersal and pelagic datasets.

Community stability – central Barents Sea.

Our analysis did not reveal strong temporal biodiversity patterns in the central part of the Barents Sea. The barplots below summarize the changes in the 10 most abundant species in this area for both the demersal and the pelagic fish community:



These barplots illustrate very well the remarkable stability of the demersal fish community, with cod and plaice *Hippoglossoides platessoides* as the two dominating species. The pelagic community is also fairly stable, despite the influence of capelin, and one can see that even in 2009-2011 when capelin was strongly dominating the community, the dominance regime is still shaped by the four same species: capelin, cod, the lumpsucker and herring.