**Supplementary material: A brief history of climate – the northern seas from the Last Glacial Maximum to global warming**

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**Access to background data**

Published pollen data can be found in the European Pollen Database, EPD (http://www.europeanpollendatabase.net/). Previously unpublished pollen data are also to be deposited in EPD, and are until then available upon request from Anne E. Bjune (anne.bjune@uni.no) or John Birks (john.birks@bio.uib.no). All published marine records presented in this study, including background foraminifera census data, are available at PANGAEA (pangaea.de). Previously unpublished marine data are also to be deposited at PANGAEA, and are until then available upon request from Bjørg Risebrobakken (bjorg.risebrobakken@uni.no) or Trond Dokken (trond.dokken@uni.no).

**Supplementary table 1.** Radiocarbon dates and calendar year calibrations that are used to calculate the age models for the terrestrial sites (site 1–14 in table I). The radiocarbon dates have been calibrated using the CLAM software (Blaauw 2010). The calibration is based on the IntCal13 calibration curve (Reimer et al. 2013). At Jansvatnet (site 13) the age-depth model is based on linear interpolation as only a few reliable 14C dates were available, at all the other sites age-depth models were constructed using a smooth spline run through randomly sampled point estimates from calibrated dates and iterating this process a thousand times (Blaauw 2010). Any models with age reversals were rejected.

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| **Table 1 ID** | **Locality** | **Lab no.** | **Sample depth, cm** | **Material dated** | **14C age (BP)** | **Cal age range**  **±1σ** | **Lake cored** | **Top of core** | **Reference** |
| 1 | Dalane | Tua-2370A | 554-554,5 | Bulk sediment | 670±70 | 538-708 | 1997 | 515 cm | Eide et al. 2006 |
| 1 | Dalane | Tua-2371A | 618-618,5 | Bulk sediment | 1345±65 | 1172-1380 |  |  | Eide et al. 2006 |
| 1 | Dalane | Tua-2372A | 714-714,5 | Bulk sediment | 2905±65 | 2868-3217 |  |  | Eide et al. 2006 |
| 1 | Dalane | Tua-2373A | 774-774,5 | Bulk sediment | 3820±65 | 4080-4416 |  |  | Eide et al. 2006 |
| 1 | Dalane | Tua-2374A | 870-870,5 | Bulk sediment | 6365±70 | 7172-7422 |  |  | Eide et al. 2006 |
| 1 | Dalane | Tua-2375A | 922-922,5 | Bulk sediment | 8130±75 | 8929-9300 |  |  | Eide et al. 2006 |
| 1 | Dalane | Tua-2376A | 930-930,5 | Bulk sediment | 8690±75 | 9529-9912 |  |  | Eide et al. 2006 |
| 1 | Dalane | Tua2377A | 945,5-946 | Bulk sediment | 9750±85 | 11061-11325 |  |  | Eide et al. 2006 |
| 2 | Vestre Øykjamyrtjørn | Poz-801 | 34-35 | Plant macrofossils | 235±45 | 258-333 | 2001 | 0 cm | Bjune 2005, Bjune et al. 2005 |
| 2 | Vestre Øykjamyrtjørn | Poz-805 | 82-83 | Plant macrofossils | 1530±30 | 1352-1424 |  |  | Bjune 2005, Bjune et al. 2005 |
| 2 | Vestre Øykjamyrtjørn | Poz-803 | 130-131 | Plant macrofossils | 2830±40 | 2850-3062 |  |  | Bjune 2005, Bjune et al. 2005 |
| 2 | Vestre Øykjamyrtjørn | Poz-802 | 178-179 | Plant macrofossils | 4590±45 | 5258-5333 |  |  | Bjune 2005, Bjune et al. 2005 |
| 2 | Vestre Øykjamyrtjørn | Poz-804 | 201-202 | Plant macrofossils | 5930±50 | 6659-6884 |  |  | Bjune 2005, Bjune et al. 2005 |
| 2 | Vestre Øykjamyrtjørn | Poz-799 | 217-218 | Plant macrofossils | 6880±50 | 7618-7804 |  |  | Bjune 2005, Bjune et al. 2005 |
| 2 | Vestre Øykjamyrtjørn | Poz-800 | 227-228 | Plant macrofossils | 7630±55 | 8362-8542 |  |  | Bjune 2005, Bjune et al. 2005 |
| 2 | Vestre Øykjamyrtjørn | Poz-806 | 241-242 | Plant macrofossils | 7990±55 | 8694-9007 |  |  | Bjune 2005, Bjune et al. 2005 |
| 2 | Vestre Øykjamyrtjørn | Poz-813 | 302-303 | Plant macrofossils | 10070±50 | 11386-11826 |  |  | Bjune 2005, Bjune et al. 2005 |
| 2 | Vestre Øykjamyrtjørn | Poz-811 | 332-333 | Plant macrofossils | 10730±60 | 12578-12733 |  |  | Bjune 2005, Bjune et al. 2005 |
| 2 | Vestre Øykjamyrtjørn | Poz-1162 | 354-356 | Plant macrofossils | 11170±60 | 12854-13144 |  |  | Bjune 2005, Bjune et al. 2005 |
| 3 | Kattatjørn | Tua-2226A | 649-650 | Bulk sediment | 1695±100 | 1387-1825 | 1996 | 630 cm | This study |
| 3 | Kattatjørn | Tua-225A | 673-674 | Bulk sediment | 1565±60 | 1333-1568 |  |  | This study |
| 3 | Kattatjørn | Tua-2224A | 721,5-722 | Bulk sediment | 3545±65 | 3683-3985 |  |  | This study |
| 3 | Kattatjørn | Tua-2223A | 745,5-746 | Bulk sediment | 5080±60 | 5707-5929 |  |  | This study |
| 3 | Kattatjørn | Tua-2222A | 807,5-808 | Bulk sediment | 7315±50 | 8009-8205 |  |  | This study |
| 3 | Kattatjørn | Tua-2221A | 837-838 | Bulk sediment | 10795±65 | 12621-12802 |  |  | This study |
| 4 | Kråkenes (Holocene) | n.a. | 274-275 | Bulk sediment | 1995±75 | 1808-2147 | 1999 | 253 cm | This study |
| 4 | Kråkenes (Holocene) | n.a. | 361-362 | Bulk sediment | 1610±75 | 1350-1632 |  |  | This study |
| 4 | Kråkenes (Holocene) | n.a. | 473-474 | Bulk sediment | 4385±75 | 4840-5086 |  |  | This study |
| 4 | Kråkenes (Holocene) | n.a. | 521-522 | Bulk sediment | 6070±70 | 6780-7158 |  |  | This study |
| 4 | Kråkenes (Holocene) | n.a. | 607-608 | Bulk sediment | 7890±65 | 8581-8982 |  |  | This study |
| 4 | Kråkenes (Holocene) | n.a. | 654-655 | Bulk sediment | 8700±70 | 9537-9905 |  |  | This study |
| 4 | Kråkenes (Late Glacial) |  |  |  |  |  |  |  | All details are given in Lohne et al. 2013 |
| 5 | Storsandvatnet | Tua-3963A | 119,5-120 | Bulk sediment | 3280±45 | 3439-3609 | 2001 | 70 cm | This study |
| 5 | Storsandvatnet | Tua-3962A | 156,5-157 | Bulk sediment | 5130±40 | 5853-5944 |  |  | This study |
| 5 | Storsandvatnet | Tua-3961A | 204,5-205 | Bulk sediment | 6025±45 | 6772-6979 |  |  | This study |
| 5 | Storsandvatnet | Tua-3960A | 244,5-245 | Bulk sediment | 7750±50 | 8423-8603 |  |  | This study |
| 5 | Storsandvatnet | Tua-3959A | 274,5-275 | Bulk sediment | 8100±50 | 8970-9144 |  |  | This study |
| 5 | Storsandvatnet | Tua-3958A | 296,5-297 | Bulk sediment | 7155±50 | 7921-8055 |  |  | This study |
| 5 | Storsandvatnet | Tua-3957A | 314,5-315 | Bulk sediment | 9165±55 | 10231-10439 |  |  | This study |
| 5 | Storsandvatnet | Tua-3956A | 334,5-335 | Bulk sediment | 9495±60 | 10584-10882. |  |  | This study |
| 5 | Storsandvatnet | Tua-3955A | 349,5-350 | Bulk sediment | 9980±65 | 11247-11713 |  |  | This study |
| 5 | Storsandvatnet | Tua-3954A | 389,5-390,5 | Bulk sediment | 11620±90 | 13269-13614 |  |  | This study |
| 6 | Svanåvatnet | Poz-17479 | 41-42 | Plant macrofossils | 1525±30 | 348-1424 | 2003 | 0 cm | Bjune & Birks 2008 |
| 6 | Svanåvatnet | Poz-17473 | 68-69 | Plant macrofossils | 2585±35 | 2698-2770 |  |  | Bjune & Birks 2008 |
| 6 | Svanåvatnet | Poz-17480 | 199-200 | Plant macrofossils | 5850±40 | 6552-6750 |  |  | Bjune & Birks 2008 |
| 6 | Svanåvatnet | Poz-17482 | 219-222 | Plant macrofossils | 6390±40 | 7263-7418 |  |  | Bjune & Birks 2008 |
| 7 | Litlvatnet | Tua-1414A | 691,5-692 | Bulk sediment | 2175±65 | 2037-2331 | 1994 | 635 cm | This study |
| 7 | Litlvatnet | Tua-1415A | 755,5-756 | Bulk sediment | 3425±80 | 3542-3874 |  |  | This study |
| 7 | Litlvatnet | Tua-1416A | 827,5-828 | Bulk sediment | 4770±100 | 5305-5664 |  |  | This study |
| 7 | Litlvatnet | Tua-1417A | 915,5-916 | Bulk sediment | 6935±95 | 7614-7941 |  |  | This study |
| 7 | Litlvatnet | Tua-1634A | 969,5-970 | Bulk sediment | 8200±100 | 8978-9466 |  |  | This study |
| 7 | Litlvatnet | Tua-1419A | 1015,5-1016 | Bulk sediment | 10655±110 | 12379-12757 |  |  | This study |
| 8 | Myrvatnet | Tua-1344A | 525,5-526 | Bulk sediment | 1650±70 | 1394-1710 | 1994 | 480 cm | This study |
| 8 | Myrvatnet | Tua-1345A | 653,5-654 | Bulk sediment | 4135±100 | 4421-4858 |  |  | This study |
| 8 | Myrvatnet | Tua-1346A | 743-744,5 | Bulk sediment | 6235±65 | 6966-7274 |  |  | This study |
| 8 | Myrvatnet | Tua-1347A | 783,5-784 | Bulk sediment | 7310±70 | 7982-8219 |  |  | This study |
| 8 | Myrvatnet | Tua-1348A | 810,5-811 | Bulk sediment | 8795±60 | 9603-9961 |  |  | This study |
| 8 | Myrvatnet | Tua-1349A | 819,5-820,5 | Bulk sediment | 11530±150 | 13086-13625 |  |  | This study |
| 9 | Bjørnfjelltjørn | Tua-1633A | 1315,5-1316 | Bulk sediment | 1475±100 | 1233-1569 | 1994 | 1290 cm | This study |
| 9 | Bjørnfjelltjørn | Tua-1632A | 1375,5-1376 | Bulk sediment | 3315±65 | 3439-3693 |  |  | This study |
| 9 | Bjørnfjelltjørn | Tua-1631A | 1398,5-1399 | Bulk sediment | 4020±75 | 4290-4713 |  |  | This study |
| 9 | Bjørnfjelltjørn | Tua-1630A | 1439,5-1440 | Bulk sediment | 5775±70 | 6435-9731 |  |  | This study |
| 9 | Bjørnfjelltjørn | Tua-1629A | 1457,5-1458 | Bulk sediment | 6790±85 | 7497-7795 |  |  | This study |
| 9 | Bjørnfjelltjørn | Tua-1628A | 1483,5-1484 | Bulk sediment | 7365±120 | 7974-8385 |  |  | This study |
| 9 | Bjørnfjelltjørn | Tua-1627A | 1511,5-1512,5 | Bulk sediment | 8315±80 | 9090-9486 |  |  | This study |
| 9 | Bjørnfjelltjørn | Tua-1626A | 1536-1540 | Bulk sediment | 9960±135 | 11180-11984 |  |  | This study |
| 10 | Lusvatnet | Poz-33966 | 169-170 | Plant macrofossils | 6160±35 | 6966-7163 | 2007 | 0 cm | Aarnes et al. 2012, Birks et al. 2014 |
| 10 | Lusvatnet | Poz-33967 | 193-194 | Plant macrofossils | 6960±40 | 7691-7865 |  |  | Aarnes et al. 2012, Birks et al. 2014 |
| 10 | Lusvatnet | Poz-33968 | 209-210 | Plant macrofossils | 7470±40 | 8197-8371 |  |  | Aarnes et al. 2012, Birks et al. 2014 |
| 10 | Lusvatnet | Poz-33969 | 225-226 | Plant macrofossils | 6580±40 | 7427-7519 |  |  | Aarnes et al. 2012, Birks et al. 2014 |
| 10 | Lusvatnet | Poz-30108 | 335-336 | Plant macrofossils | 8210±50 | 9020-9306 |  |  | Aarnes et al. 2012, Birks et al. 2014 |
| 10 | Lusvatnet | Poz-33965 | 243-244 | Plant macrofossils | 8360±40 | 9289-9473 |  |  | Aarnes et al. 2012, Birks et al. 2014 |
| 10 | Lusvatnet | Poz-33964 | 259-260 | Plant macrofossils | 8980±35 | 10131-10232 |  |  | Aarnes et al. 2012, Birks et al. 2014 |
| 10 | Lusvatnet | Poz-24476 | 271-272 | Plant macrofossils | 9230±50 | 10251-10520 |  |  | Aarnes et al. 2012, Birks et al. 2014 |
| 10 | Lusvatnet | Poz-30109 | 281-282 | Plant macrofossils | 9580±50 | 10737-11131 |  |  | Aarnes et al. 2012, Birks et al. 2014 |
| 10 | Lusvatnet | Poz-33963 | 294-295 | Plant macrofossils | 9640±50 | 1078-11034 |  |  | Aarnes et al. 2012, Birks et al. 2014 |
| 10 | Lusvatnet | Poz-33915 | 315-316 | Plant macrofossils | 9910±60 | 11214-11499 |  |  | Aarnes et al. 2012, Birks et al. 2014 |
| 10 | Lusvatnet | Poz-30107 | 319-320 | Plant macrofossils | 3420±35 | 3578-3728 |  |  | Aarnes et al. 2012, Birks et al. 2014 |
| 10 | Lusvatnet | Poz-24477 | 339-340 | Plant macrofossils | 10150±60 | 11599-12056 |  |  | Aarnes et al. 2012, Birks et al. 2014 |
| 10 | Lusvatnet | Poz-30106 | 379-380 | Plant macrofossils | 10350±50 | 12008-12401 |  |  | Aarnes et al. 2012, Birks et al. 2014 |
| 10 | Lusvatnet | Poz-33914 | 388-389 | Plant macrofossils | 10600±60 | 12516-12697 |  |  | Aarnes et al. 2012, Birks et al. 2014 |
| 10 | Lusvatnet | Poz-33913 | 399-400 | Plant macrofossils | 10640±60 | 12527-12714 |  |  | Aarnes et al. 2012, Birks et al. 2014 |
| 10 | Lusvatnet | Poz-33911 | 415-416 | Plant macrofossils | 10630±60 | 12524-12711 |  |  | Aarnes et al. 2012, Birks et al. 2014 |
| 10 | Lusvatnet | Poz-22884 | 427-428 | Plant macrofossils | 10550±60 | 12386-12687 |  |  | Aarnes et al. 2012, Birks et al. 2014 |
| 10 | Lusvatnet | Poz-33910 | 439-440 | Plant macrofossils | 10300±60 | 11931-12389 |  |  | Aarnes et al. 2012, Birks et al. 2014 |
| 10 | Lusvatnet | Poz-22885 | 442-443 | Plant macrofossils | 9910±50 | 11217-11411 |  |  | Aarnes et al. 2012, Birks et al. 2014 |
| 10 | Lusvatnet | Poz-33909 | 475-476 | Plant macrofossils | 11390±60 | 13096-13353 |  |  | Aarnes et al. 2012, Birks et al. 2014 |
| 10 | Lusvatnet | Poz-30105 | 489-490 | Plant macrofossils | 11220±60 | 12974-13225 |  |  | Aarnes et al. 2012, Birks et al. 2014 |
| 10 | Lusvatnet | Poz-22886 | 511-512 | Plant macrofossils | 11920±60 | 13568-13867 |  |  | Aarnes et al. 2012, Birks et al. 2014 |
| 11 | Dalmutladdo | Hela-499 | 6-7 cm | Plant macrofossils | 605±70 | 521-671 | 2001 | 0 cm | Bjune et al. 2004 |
| 11 | Dalmutladdo | Hela-508 | 22-23 cm | Plant macrofossils | 775±65 | 642-800 |  |  | Bjune et al. 2004 |
| 11 | Dalmutladdo | Hela-500 | 48-49 cm | Plant macrofossils | 1725±65 | 1522-1820 |  |  | Bjune et al. 2004 |
| 11 | Dalmutladdo | Hela-509 | 75-76 cm | Plant macrofossils | 2555±105 | 2356-2804 |  |  | Bjune et al. 2004 |
| 11 | Dalmutladdo | Hela-513 | 113-114 cm | Plant macrofossils | 3495±65 | 3610-3925 |  |  | Bjune et al. 2004 |
| 11 | Dalmutladdo | Hela-510 | 137-138 cm | Plant macrofossils | 4615±75 | 5212-5482 |  |  | Bjune et al. 2004 |
| 11 | Dalmutladdo | Hela-502 | 173-174 cm | Plant macrofossils | 5620±85 | 6283-6569 |  |  | Bjune et al. 2004 |
| 11 | Dalmutladdo | Hela-511 | 210-211 cm | Plant macrofossils | 7225±115 | 7844-8312 |  |  | Bjune et al. 2004 |
| 11 | Dalmutladdo | Hela-503 | 226-227 cm | Plant macrofossils | 7730±90 | 8371-8728 |  |  | Bjune et al. 2004 |
| 11 | Dalmutladdo | Hela-512 | 247-248 cm | Plant macrofossils | 8110±120 | 8647-9321 |  |  | Bjune et al. 2004 |
| 11 | Dalmutladdo | Hela-504 | 265-266 cm | Plant macrofossils | 8765±110 | 9547-9968 |  |  | Bjune et al. 2004 |
| 12 | Ifjord | Hela-3616 | 142-152 | Bulk sediment | 6400±110 | 7155-7511 | 1993 | 0 cm | Seppä 1998, Seppä et al. 2002 |
| 12 | Ifjord | Hela-3617 | 202-212 | Bulk sediment | 8290±140 | 8980-9542 |  |  | Seppä 1998, Seppä et al. 2002 |
| 12 | Ifjord | Hela-3618 | 222-232 | Bulk sediment | 9360±100 | 10256-10794 |  |  | Seppä 1998, Seppä et al. 2002 |
| 12 | Ifjord | Hela-3619 | 282-297 | Bulk sediment | 10600±190 | 11947-12855 |  |  | Seppä 1998, Seppä et al. 2002 |
| 13 | Jansvatnet | Poz-11778 | 1190-1191 | Plant macrofossil | 8360±50 | 9260-9489 | 2000 | 920 cm | Birks et al. 2012 |
| 13 | Jansvatnet | Poz-11779 | 1204-1205 | Plant macrofossil | 8860±50 | 9762-10172 |  |  | Birks et al. 2012 |
| 13 | Jansvatnet | Poz-11863 | 1260-1261 | Plant macrofossil | 10360±550 | 12018-12407 |  |  | Birks et al. 2012 |
| 13 | Jansvatnet | Poz-11864 | 1280-1281 | Moss | 10430±50 | 12102-12444 |  |  | Birks et al. 2012 |
| 13 | Jansvatnet | Poz-11866 | 294-1295 | Moss | 10960±60 | 12716-12983 |  |  | Birks et al. 2012 |
| 13 | Jansvatnet | Poz-11867 | 1316-1317 | Moss | 12280±60 | 14013-1487 |  |  | Birks et al. 2012 |
| 14 | Hopseidet | Hela-3539 | 63-73 | Bulk sediment | 4400±110 | 4816-5320 | 1993 | 0 cm | Seppä 1996, 1998, Seppä et al. 2009 |
| 14 | Hopseidet | Hela-3540 | 113-123 | Bulk sediment | 6510±100 | 7259-7577 |  |  | Seppä 1996, 1998, Seppä et al. 2009 |
| 14 | Hopseidet | Hela-3541 | 178-188 | Bulk sediment | 9290±140 | 10200-10807 |  |  | Seppä 1996, 1998, Seppä et al. 2009 |
| 14 | Hopseidet | Hela-3542 | 194-204 | Bulk sediment | 10570±110 | 12361-12711 |  |  | Seppä 1996, 1998, Seppä et al. 2009 |

**Supplementary table 2.** Radiocarbon dates, ash horizons and calendar year calibrations that are used to calculate the age models of the marine sites (15–20 in Table 1). Ages for Vedde Ash and Saksurnavatn Ash are from [Rasmussen et al., 2006]. ∆R shows the geographically and time dependent reservoir corrections that have been used (based on Bondevik et al., 2006; Mangerud et al., 2006). ∆R values representative for HS1 and LGM in the Nordic Seas are not known. Here, HS1 is considered to be comparable to YD and LGM to the Holocene, based on present knowledge on the oceanography of the study for these time periods. We have, however, increased the ∆R uncertainty used for HS1 and LGM to acknowledge that there are larger uncertainties related to the chosen ∆R values for these time periods. The ∆R values used are: Holocene 7±11 yr; YD 250±50 yr; Allerød 100±50 yr; Bølling 7±11 yr; HS1 250±100 yr and LGM 7±100 yr. The radiocarbon dates has been calibrated using Calib 7.0 and the Marine13 calibration data set [Reimer et al., 2013]. Ages are defined by linear interpolation between dated tie points. A few dates have been omitted as they gave inverted ages, probably due to resedimentation. NPD=*N. pachyderma* (dex), NPS= *N. pachyderma* (sin).

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| **Table 1 ID** | **Locality** | **Lab no.** | **Sample depth,**  **cm** | **Material dated** | **14C age**  **(BP)** | **∆R** | **Cal age range ±1σ** | **Rel prob** | **Cal age BP 1950 (med prob)** | **Comment** | **Reference** |
| 20 | PSh-5159N | Poz-15130 | 7.5 | Mollusc fragments, benthic foraminifera | 102.46\_0.32pMC | 71±21 |  |  |  |  | Ivanova et al. (2008) |
| 20 | PSh-5159R | Poz-20399 | 14.17 | Lenticulina sp. | 635±30 | 71±21 | 145-167  80-285 | 0.201  0.799 | 197 |  | Ivanova et al. (2008) |
| 20 | PSh-5159N | Poz-19995 | 21.5 | Bulk foraminifera | 1670±30 | 71±21 | 1120-1214 | 1 | 1167 |  | Ivanova et al., (2008) |
| 20 | PSh-5159N | Poz-19997 | 40.5 | Bulk foraminifera | 2845±30 | 71±21 | 2430-2604 | 1 | 2513 |  | Risebrobakken et al. (2010) |
| 20 | PSh-5159N | Poz-20568 | 45.5 | Bulk foraminifera | 4960±40 | 71±21 | 5132-5286 | 1 | 5204 |  | Risebrobakken et al. (2010) |
| 20 | PSh-5159N | Poz-15131 | 50.5 | Mollusc fragments | 6105±35 | 71±21 | 6392-6499 | 1 | 6450 |  | Risebrobakken et al. (2010) |
| 20 | PSh-5159N | Poz-19998 | 60.5 | Bulk foraminifera | 7040±40 | 71±21 | 7423-7506 | 1 | 7471 |  | Risebrobakken et al. (2010) |
| 20 | PSh-5159N | Poz-12701 | 69.5 | Brachiopod | 7500±40 | 71±21 | 7843-7938 | 1 | 7891 |  | Risebrobakken et al. (2010) |
| 20 | PSh-5159N | Poz-19999 | 86.5 | Bulk foraminifera | 8550±50 | 71±21 | 9006-9165 | 1 | 9099 |  | Risebrobakken et al. (2010) |
| 20 | PSh-5159N | Poz-15132 | 99.5 | Mollusc fragments, benthic foraminifera, ostracode | 9700±50 | 71±21 | 10435-10586 | 1 | 10515 |  | Risebrobakken et al. (2010) |
| 20 | PSh-5159R | Poz-19991 | 122.5 | Mollusc | 10010±50 | 71±21 | 10804-11013 | 1 | 10908 |  | Chistyakova et al. (2010); Risebrobakken et al. (2010) |
| 20 | PSh-5159N | Poz-15133 | 133.5 | Mollusc fragments | 10290±50 | 250±50 | 10943-11144 | 1 | 11032 |  | Risebrobakken et al. (2010) |
| 20 | PSh-5159N | Poz-12629 | 148.5 | Astarte crenata | 10360±50 | 250±50 | 11039-11196 | 1 | 11109 |  | Risebrobakken et al. (2010) |
| 20 | PSh-5159R | Poz-16594 | 241 | Bulk benthic foraminifera | 12150±70 | 71±21 | 13873-13877  13925-14139 | 0.008  0.992 | 14023 |  | Chistyakova et al. (2010); Risebrobakken et al. (2010) |
| 20 | PSh-5159R | Poz-19992 | 333 | Bulk benthic foraminifera | 13550±70 | 250±50 | 15255-15558 | 1 | 15409 |  | Chistyakova et al. (2010); Risebrobakken et al. (2010) |
|  |  |  |  |  |  |  |  |  |  |  |  |
| 19 | M23258 | KIA7648 | 25 | NPS | 1165±35 | 71±21 | 622-689 | 1 | 656 |  | Sarnthein et al. (2003) |
| 19 | M23258 | KIA7649 | 51 | NPS | 2555±30 | 71±21 | 2071-2212 | 1 | 2145 |  | Sarnthein et al. (2003) |
| 19 | M23258 | KIA7650 | 67 | NPS | 3500±35 | 71±21 | 3245-3355 | 1 | 3300 |  | Sarnthein et al. (2003) |
| 19 | M23258 | KIA7651 | 93 | NPS | 4825±40 | 71±21 | 4889-5067 | 1 | 5002 |  | Sarnthein et al. (2003) |
| 19 | M23258 | KIA11534 | 118 | NPD | 6140±70 | 71±21 | 6406-6581 | 1 | 6494 |  | Sarnthein et al. (2003) |
| 19 | M23258 | KIA7653 | 154 | NPS | 7660±45 | 71±21 | 7986-8109 | 1 | 8048 |  | Sarnthein et al. (2003) |
| 19 | M23258 | KIA7654 | 177 | NPS | 8380±45 | 71±21 | 8793-8966 | 1 | 8868 |  | Sarnthein et al. (2003) |
| 19 | M23258 | KIA8553 | 192 | NPS | 8760±40 | 71±21 | 9308-9423 | 1 | 9364 |  | Sarnthein et al. (2003) |
| 19 | M23258 | KIA11535 | 207 | NPD | 8955±55 | 71±21 | 9469-9592 | 1 | 9536 |  | Sarnthein et al. (2003) |
| 19 | M23258 | KIA9193 | 241 | NPS | 9330±70 | 71±21 | 9958-9982  9993-10179 | 0.091  0.909 | 10065 |  | Sarnthein et al. (2003) |
| 19 | M23258 | KIA8554 | 249 | NPS | 9235±50 | 71±21 | 9868-10090 | 1 | 9955 | Not used | Sarnthein et al. (2003) |
| 19 | M23258 | KIA9354 | 250 | NPS | 9435±55 | 71±21 | 10142-10255 | 1 | 10203 |  | Sarnthein et al. (2003) |
| 19 | M23258 | KIA7657 | 315 | NPS | 10980±70 | 200±50 | 11993-12351 | 1 | 12163 |  | Sarnthein et al. (2003) |
| 19 | M23258 | KIA7659 | 355 | NPS | 12010±55 | 71±21 | 13370-13508 | 1 | 13444 |  | Sarnthein et al. (2003) |
| 19 | M23258 | KIA9354 | 394 | NPS | 12390±60 | 71±21 | 13702-13881 | 1 | 13790 |  | Sarnthein et al. (2003) |
|  |  |  |  |  |  |  |  |  |  |  |  |
| 16 | MD95-2010 |  | 34.5 | Vedde ash - base |  |  |  |  | 12170 | Vedde | Dokken and Jansen (1999) |
| 16 | MD95-2010 | KIA6551 | 54.5 | NPS | 11415±55 | 100±50 | 12695-12860 | 1 | 12784 |  | [Dokken and Jansen (1999](#_ENREF_2)) |
| 16 | MD95-2010 | KIA6552 | 136.5 | NPS | 13250±60 | 250±100 | 14667-15174 | 1 | 14879 |  | [Dokken and Jansen (1999](#_ENREF_2)) |
| 16 | MD95-2010 | KIA6553 | 173.5 | NPS | 14750±110 | 250±100 | 16931-17394 | 1 | 17134 |  | [Dokken and Jansen (1999](#_ENREF_2)) |
| 16 | MD95-2010 | KIA6554 | 197.5 | NPS | 15620±70 | 250±100 | 18032-18341 | 1 | 18192 |  | [Dokken and Jansen (1999](#_ENREF_2)) |
| 16 | MD95-2010 | KIA6555 | 300.5 | NPS | 16990±110 | 7±100 | 19792-20197 | 1 | 19999 |  | [Dokken and Jansen (1999](#_ENREF_2)) |
| 16 | MD95-2010 | GifA96476 | 449.5 | NPS | 19830±130 | 7±100 | 23140-23595 | 1 | 23381 |  | [Dokken and Jansen (1999](#_ENREF_2)) |
| 16 | MD95-2010 | GifA96477 | 450.5 | NPS | 20030±110 | 7±100 | 23293-23743 | 1 | 23511 |  | [Dokken and Jansen (1999](#_ENREF_2)) |
| 16 | MD95-2010 | GifA96487 | 459.5 | NPS | 19930±120 | 7±100 | 23450-23846 | 1 | 23635 |  | [Dokken and Jansen (1999](#_ENREF_2)) |
| 16 | MD95-2010 | GifA96489 | 464.5 | NPS | 20340±120 | 7±100 | 23781-24175 | 1 | 23977 |  | [Dokken and Jansen (1999](#_ENREF_2)) |
| 16 | MD95-2010 |  | 484,5 | NPS | 20450±120 | 7±100 | 23916-24295 | 1 | 24101 |  | This study |
| 16 | MD95-2010 |  | 521,5 | NPS | 21590±190 | 7±100 | 25295-25737 | 1 | 25504 |  | This study |
|  |  |  |  |  |  |  |  |  |  |  |  |
| 17/18 | JM97-948/2A | KIA 6285 | 21.75 | NPD | 735±40 | 7±11 | 316-418 | 1 | 371 |  | Risebrobakken et al. (2003) |
| 17/18 | JM97-948/2A | KIA 4800 | 30.75 | NPD | 940±40 | 7±11 | 493-565 | 1 | 536 |  | Risebrobakken et al. (2003) |
| 17/18 | MD95-2011 | Poz-8245 | 5 | NPD | 1020±100 | 7±11 | 516-661 | 1 | 595 | Not used | Risebrobakken et al. (2011) |
| 17/18 | MD95-2011 | GifA96471 | 10.5 | NPD | 980±60 | 7±11 | 521-616 | 1 | 569 |  | Risebrobakken et al. (2003) |
| 17/18 | MD95-2011 | KIA 5600 | 24.5 | NPD | 1590±40 | 7±11 | 1089-1206 | 1 | 1146 | Not used | Risebrobakken et al. (2003) |
| 17/18 | MD95-2011 | KIA 3925 | 30.5 | NPD | 1040±40 | 7±11 | 564-643 | 1 | 605 |  | Risebrobakken et al. (2003) |
| 17/18 | MD95-2011 | KIA 5601 | 47.5 | NPD | 1160±30 | 7±11 | 664-724 | 1 | 698 |  | Risebrobakken et al. (2003) |
| 17/18 | MD95-2011 | Poz-8244 | 55.5 | NPD | 1530±90 | 7±11 | 973-1171 | 1 | 1079 | Not used | Risebrobakken et al. (2011) |
| 17/18 | MD95-2011 | KIA 3926 | 70.5 | NPD | 1460±50 | 7±11 | 935-1052 | 1 | 1003 |  | Risebrobakken et al. (2003) |
| 17/18 | MD95-2011 | KIA 6286 | 89.5 | NPD | 1590±30 | 7±11 | 1092-1192  1198-1200 | 0.986  0.014 | 1148 |  | Risebrobakken et al. (2003) |
| 17/18 | MD95-2011 | Poz-8246 | 102 | NPD | 1790±60 | 7±11 | 1271-1387 | 1 | 1333 |  | Risebrobakken et al. (2011) |
| 17/18 | MD95-2011 | KIA 3927 | 130.5 | NPD | 2350±40 | 7±11 | 1897-2016 | 1 | 1962 | Not used | Risebrobakken et al. (2003) |
| 17/18 | MD95-2011 | KIA 6287 | 154 | NPD | 2335±25 | 7±11 | 1998-1982 | 1 | 1943 |  | Risebrobakken et al. (2003) |
| 17/18 | MD95-2011 | GifA96472 | 170.5 | NPD | 2620±60 | 7±11 | 2185-2353 | 1 | 2293 |  | Risebrobakken et al. (2003) |
| 17/18 | MD95-2011 | Poz-8242 | 225 | NPD | 3000±50 | 7±11 | 2719-2815 | 1 | 2769 |  | Risebrobakken et al. (2011) |
| 17/18 | MD95-2011 | Poz-8241 | 250 | NPD | 3380±70 | 7±11 | 3149-3333 | 1 | 3232 |  | Risebrobakken et al. (2011) |
| 17/18 | MD95-2011 | KIA 10011 | 269.5 | NPD | 3820±35 | 7±11 | 3703-3818 | 1 | 3760 |  | Risebrobakken et al. (2003) |
| 17/18 | MD95-2011 | Poz-8240 | 300 | NPD | 4080±70 | 7±11 | 3998-4216 | 1 | 4112 |  | Risebrobakken et al. (2011) |
| 17/18 | MD95-2011 | KIA 463 | 320.5 | NPD | 4330±50 | 7±11 | 4388-4522 | 1 | 4456 |  | Risebrobakken et al. (2003) |
| 17/18 | MD95-2011 | Poz-8238 | 451 | NPD | 6420±160 | 7±11 | 6717-7103 | 1 | 6897 |  | Risebrobakken et al. (2011) |
| 17/18 | MD95-2011 | KIA 464 | 520.5 | NPD | 7260±60 | 7±11 | 7651-7783 | 1 | 7717 |  | Risebrobakken et al. (2003) |
| 17/18 | MD95-2011 | Poz-8237 | 528.5 | NPD | 7690±110 | 7±11 | 8025-8265 | 1 | 8145 |  | Risebrobakken et al. (2011) |
| 17/18 | MD95-2011 | Poz-8236 | 533.5 | NPD | 8530±160 | 7±11 | 8978-9374 | 1 | 9142 | Not used | Risebrobakken et al. (2011) |
| 17/18 | MD95-2011 | Poz-8235 | 541.5 | NPD | 8280±140 | 7±11 | 8613-8986 | 1 | 8810 |  | Risebrobakken et al. (2011) |
| 17/18 | MD95-2011 | Poz-8234 | 570.5 | NPD | 8700±90 | 7±11 | 9264-9461 | 1 | 9350 |  | Risebrobakken et al. (2011) |
| 17/18 | MD95-2011 | TUa-3315 | 703.5 | NPS | 10775±85 | 250±50 | 11475-11506  11534-11962 | 0.052  0.948 | 11725 |  | Risebrobakken et al. (2003) |
| 17/18 | MD95-2011 |  | 709.5 | Tephra |  |  |  |  | 12170 | Vedde Ash | Risebrobakken et al. (2003) |
| 17/18 | MD95-2011 | TUa-3316 | 730.5 | NPS | 11875±140 | 100±50 | 13104-13393 | 1 | 13242 |  | Risebrobakken et al. (2003) |
| 17/18 | MD95-2011 | KIA465 | 750.5 | NPS | 12220±90 | 7±11 | 13546-13779 | 1 | 13667 |  | Risebrobakken et al. (2003) |
| 17/18 | MD95-2011 | KIA3519 | 813.5 | NPS | 13450±90 | 250±100 | 15064-15528 | 1 | 15256 |  | Dreger (1999) |
|  |  |  |  |  |  |  |  |  |  |  |  |
| 15 | MD99-2284 | KIA-10676 | 2.5 | NPS | 1690±30 | 7±11 | 1216-1281 | 1 | 1245 |  | Risebrobakken et al. (2011) |
| 15 | MD99-2284 | Poz-10150 | 19.5 | NPS | 3515±35 | 7±11 | 3350-3437 | 1 | 3394 |  | Risebrobakken et al. (2011) |
| 15 | MD99-2284 | Poz-10151 | 36.5 | NPS | 5295±35 | 7±11 | 5593-5678 | 1 | 5643 |  | Risebrobakken et al. (2011) |
| 15 | MD99-2284 | Poz-10157 | 53.5 | NPS | 7300±40 | 7±11 | 7696-7802 | 1 | 7753 |  | Risebrobakken et al. (2011) |
| 15 | MD99-2284 | Poz-33098 | 71.5 | NPS | 7940±70 | 7±11 | 8324-8468 | 1 | 8396 |  | Risebrobakken et al. (2011) |
| 15 | MD99-2284 | TUa-3301 | 100.5 | NPS | 8680±85 | 7±11 | 9248-9443 | 1 | 9332 |  | Bakke et al. (2009) |
| 15 | MD99-2284 | Poz-33098 | 165.5 | NPS | 9340±90 | 7±11 | 10024-10276 | 1 | 10162 |  |  |
| 15 | MD99-2284 |  | 185.5 | Tephra |  |  |  |  | 10350 | Saksurnavatn Ash | [Bakke et al. (2009](#_ENREF_1)) |
| 15 | MD99-2284 | TUa-3302 | 213.5 | NPS | 10050±95 | 7±11 | 10911-11159 | 1 | 11022 |  | [Bakke et al. (2009](#_ENREF_1)) |
| 15 | MD99-2284 | TUa-3304 | 249.5 | NPS | 10700±90 | 250±50 | 11350-11784 | 1 | 11592 |  | [Bakke et al. (2009](#_ENREF_1)) |
| 15 | MD99-2284 |  | 362.5 | Tephra |  |  |  |  | 12170 | Vedde Ash | [Bakke et al. (2009](#_ENREF_1)) |
| 15 | MD99-2284 | Poz-29526 | 423.5 | NPS | 11440±80 | 250±50 | 12603-12758 | 1 | 12689 |  | Risebrobakken et al. (2011) |
| 15 | MD99-2284 |  | 450.5 | NPS | 11960±90 | 7±11 | 13309-13488 | 1 | 13405 |  | This study |
| 15 | MD99-2284 |  | 472.5 | NPS | 12240±75 | 7±11 | 13581-13793 | 1 | 13689 |  | This study |
| 15 | MD99-2284 |  | 502.5 | NPS | 12600±130 | 7±11 | 13873-14301 | 1 | 14126 |  | This study |
| 15 | MD99-2284 |  | 542.5 | NPS | 12980±130 | 250±100 | 14071-14711 | 1 | 14420 |  | This study |
| 15 | MD99-2284 | Poz-10154 | 546.5 | NPS | 13080±60 | 250±100 | 14229-14790 | 1 | 14557 |  | This study |
| 15 | MD99-2284 |  | 600.5 | NPS | 13500±70 | 250±100 | 15151-15544 | 1 | 15341 |  | This study |
| 15 | MD99-2284 |  | 650.5 | NPS | 13550±100 | 250±100 | 15199-15634 | 1 | 15417 |  | This study |
| 15 | MD99-2284 | POZ-10155 | 687.5 | NPS | 13710±60 | 250±100 | 15416-15819 | 1 | 15632 |  | This study |
| 15 | MD99-2284 |  | 749.5 | NPS | 14320±115 | 250±100 | 16252-16729 | 1 | 16500 |  | This study |
| 15 | MD99-2284 |  | 788.5 | NPS | 15330±70 | 7±100 | 19990-18293 | 1 | 18142 |  | This study |
| 15 | MD99-2284 |  | 805.5 | NPS | 15550±190 | 7±100 | 18137-18621 | 1 | 18377 |  | This study |
| 15 | MD99-2284 |  | 819.5 | NPS | 15730±70 | 7±100 | 18459-18724 | 1 | 18583 |  | This study |
| 15 | MD99-2284 |  | 849.5 | NPS | 16110±120 | 7±100 | 18785-19132 | 1 | 18964 |  | This study |
| 15 | MD99-2284 |  | 900.5 | NPS | 17195±90 | 7±100 | 20078-20426 | 1 | 20250 |  | This study |
| 15 | MD99-2284 |  | 1000.5 | NPS | 19725±120 | 7±100 | 23047-23468 | 1 | 23260 |  | This study |
| 15 | MD99-2284 |  | 1100.5 | NPS | 21975±160 | 7±100 | 25692-26003 | 1 | 25845 |  | This study |

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