Supplemental Material for

Response of biological productivity to North Atlantic marine front migration during the Holocene

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**Table S1:** Marine sediment core proxy records from Iceland’s insular shelves.

| Marine core | Time Interval (ka BP) | Proxies | Reference |
|-------------|-----------------------|---------|-----------|
| MD99-2269   | 10 to 0               | diatoms | Andersen et al. (2004) |
| MD99-2269   | 10 to 0               | coccolithophores, CaCO₃, low-resolution benthic foram. | Giraudeau et al. (2004) |
| MD99-2269   | 11.5 to 0             | CaCO₃, quartz | Moros et al. (2006) |
| MD99-2269   | 10 to 0               | dinocysts | Solignac et al. (2006) |
| MD99-2269   | 4 to 0                | Mg/Ca of benthic foram. | Kristjánssdóttir et al. (2007a) |
| MD99-2269   | 12 to 0               | tephra | Kristjánssdóttir et al. (2007b) |
| MD99-2269   | 12 to 0               | PSV age model | Stoner et al. (2007) |
| MD99-2269   | 11.5 to 0             | diatoms | Justwan et al. (2008) |
| MD99-2269   | 8 to 0                | IP₂₅, HBI III, T. quinqueloba, N. pachyderma (s) | Cabedo-Sanz et al. (2016) |
| MD99-2269   | 11.4 to 0.4           | Mg/Ca and δ¹⁸O of benthic and planktic foram., δ¹³C planktic foram., alkenones | Kristjánssdóttir et al. (2017) |
| JR51-GC35   | 10.2 to 0             | ¹⁴C chronology, alkenones | Bendle & Rosell-Melé (1997) |
| JR51-GC35 and MD99-2264 | 12 to 0 | minerology | Andrews et al. (2014) |
| JR51-GC35   | 8 to 0                | HBI, planktic foraminifera | Cabedo-Sanz et al. (2016) |
| MD99-2275   | 1.2 to 0              | IP₂₅ | Massé et al. (2008) |
| MD99-2275   | 2 to 0                | diatoms | Jiang et al. (2005) |
| MD99-2275 and -2271 | 2 to 0 | dinocysts, benthic and planktic foram. and δ¹⁸O, diatoms, sedimentology | Eiriksson et al. (2006) |
| MD99-2275   | 2 to 0                | alkenones | Sicre et al. (2008a) |
| MD99-2275   | 4.5 to 0              | alkenones, magnetics | Sicre et al. (2008b) |
| B05-2006-MC04 | 0.13 to 0           | benthic and planktic foram., diatoms, IRD | Knudsen et al. (2009) |
| MD99-2275   | 2 to 0                | alkenones | Sicre et al. (2011) |
| MD99-2275   | 15 to 0               | tephra | Gudmundsdóttir et al. (2012) |
| MD99-2275   | 1 to 0                | benthic and planktic foram. and δ¹⁸O | Knudsen et al. (2012) |
| MD99-2275   | 9.3 to 0              | diatoms | Jiang et al. (2015) |
| HM107-04 and -05 | 14 to 0            | grain size, minerology, MS, water content, CaCO₃, benthic and planktic foram., tephra | Eiriksson et al. (2000a) |
| HM107-03    | 4.5 to 0              | benthic and planktic foram., grain size, IRD, tephra | Eiriksson et al. (2000b) |
| HM107-03    | 4.6 to 0              | diatoms | Jiang et al. (2002) |
| HM107-04 and -05 | 15.8 to 0        | benthic and planktic foram. and δ¹⁸O, diatoms | Knudsen et al. (2004a) |
| Core Numbers | Sample Duration | Analytical Parameters | Authors |
|-------------|-----------------|-----------------------|---------|
| HM107-03 and -02, MD99-2275 | 1.2 to 0 | benthic and planktic foram. and δ¹⁸O, diatoms, IRD | Knudsen et al. (2004b) |
| MD99-2264 and B997 cores | 36 to 0 | IRD, CaCO₃, MS | Geirsdóttir et al. (2002) |
| MD99-2256 and -2264 | 11.5 to 0 | benthic foram. and δ¹⁸O | Ólafsdóttir et al. (2012) |
| MD99-2266 | 10.6 to 0.5 | δ¹⁸O of benthic foram., CaCO₃, MS, grain size, carbonate, IRD | Quillmann et al. (2010) |
| MD99-2266 | 8.4 to 7.6 | Mg/Ca and δ¹⁸O of benthic foram., CaCO₃ | Quillmann et al. (2012) |
| MD99-2266 | 10.7 to 0.3 | C, N, GDGTs, alkenones, n-alkanes | Moossen et al. (2013) |
| MD99-2266 | 10.7 to 0.3 | GDGTs, alkenones, n-alkanes and δD | Moossen et al. (2015) |
| MD99-2263 | 2 to 0 | grain size, magnetics, benthic and planktic foram and δ¹⁸O, IP₂⁵ | Andrews et al. (2009) |
| MD99-2263 | 12 to 0 | minerology, IRD, CaCO₃, IP₂⁵ | Darby et al. (2017) |
| MD99-2271, -2272, -2275 | 4.5 to 0 | grain size, C, MS, water content, CaCO₃, benthic and planktic foram., tephra | Knudsen & Eiriksson (2002) |
| MD99-2271, -2273, -2275 | 4.5 to 0 | tephra and ¹⁴C | Eiriksson et al. (2004) |
| MD99-2273 | 0.9 to 0.5 | alkenones, IP₂⁵ | Sicre et al. (2013) |
| MD99-2272 | 15 to 4 | IP₂⁵, HBI III, sterols, n-alkanols, tephra | Xiao et al. (2017) |
| B997 cores | <45 | ¹⁴C | Andrews et al. (2000) |
| B997 cores | 4 to 0 | MS, CaCO₃, grain size, pollen | Andrews et al. (2001a) |
| B997 cores | 5 to 0 | CaCO₃ | Andrews et al. (2001b) |
| B997 cores | 10.2 | tephra, magnetics | Andrews et al. (2002a) |
| B997 cores | 36 to 0 | grain size, IRD, density, MS, magnetics, C, CaCO₃ | Andrews et al. (2002b) |
| B997 cores | 10 to 0 | coccolithophores, CaCO₃ | Andrews & Giraudau (2003) |
| B997 cores | 44 to 0 | grain size, density, MS, foram., tephra | Andrews & Helgadóttir (2003) |
| B997 cores | 14 to 0 | benthic and planktic foram and δ¹⁸O | Castaneda et al. (2004) |
| B997 cores | 10 to 0 | benthic and planktic foram and δ¹⁸O | Smith et al. (2005) |
| B997 cores | 2 to 0 | minerology | Andrews & Eberl (2007) |
| B997 cores | 12 to 0 | PSV | Andrews et al. (2008) |
| B997 cores | 12 to 0 | minerology | Andrews (2009) |
| B997 cores | 0.8 to 0 | quartz, CaCO₃, IP₂⁵, HBI III, GDGTs | Harning et al. (2019) |
| KN 158-4-72GGC (Djúpall) | carbonate, grain size, minerology | Andresen et al. (2005) |
|--------------------------|----------------------------------|------------------------|
| 93030-006 LCF | 12.7 to 9.4 (14C yrs) | grain size, IRD, C, CaCO3, MS, benthic and planktic foram., tephra | Jennings et al. (2000) |
| 93030-03BC | 0.4 to 0 | C, minerology, magnetics, CaCO3, planktic foram. and δ18O and δ13C | Jennings et al. (2001) |

**Fig. S1:** Structures of highly branched isoprenoid (HBI) biomarkers discussed in the current study.
Fig. S2: Fractional abundances of individual GDGTs and GDGT-0/crenarchaeol ratios for MD99-2269 (left) and JR51-GC35 (right). GDGT-0/crenarchaeol values around and below 2 (grey dotted line) indicate minimal GDGT contributions from methanogenic archaea that may compromise TEX$_{86}$-based temperature inferences (e.g. Blaga et al., 2009).
Fig. S3: Downcore HBI IV records from a) MD99-2269 and b) JR51-GC35.
Fig. S4: Planktic foraminiferal species in MD99-2269 used to estimate summer SSTs over the last 10 ka BP, with emphasis on high-resolution estimates for the past 8 cal ka BP. Colors indicate environmental preferences: red=Atlantic Water species, blue=Arctic, green=frontal species.
Fig S5: Select benthic species used to estimate BWT in MD99-2269 over the last 8 cal ka BP. Species colors indicate environmental preferences: red=Atlantic; blue=Arctic, purple=mixed Atlantic Water, green=productivity, yellow=indifferent.
Fig. S6: Downcore records from MD99-2269 for planktic and benthic foraminifera per gram. Bold line is a 5-pt running mean.
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