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Tephras in deep-sea core PS2644 off NW Iceland: Time markers for the last glacial period

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Deep-sea core PS2644-5, retrieved from the northwestern margin of Iceland (67°52.02'N, 21°45.92'W; 777 m water depth), exhibits high sedimentation rates during the last glacial cycle that allow the clear distinction of Greenland stadial (GS)/ interstadial (GI) cycles in the various proxy records (e.g., Voelker et al., 1998). Abundance records of rhyolitic, basaltic and tachylytic tephra grains, counted in the faction >150μm, reveal several abundance maximum within the glacial sequence. Prominent tephras found in the core are a basaltic tephra within GI 21, North Atlantic Ash Zone (NAAZ) II, which encompasses various eruptions, and a basaltic tephra at the Heinrich event 5/ GI 12 transition. Several minor abundance peaks were found around and within GI 8. Additional peaks, some of which might consist mainly of ice-rafted tephra grains, were found during the remaining periods of Marine Isotope Stage (MIS) 3 and during MIS 2. Tephra grains from all the prominent and most of the minor abundance peaks were analyzed for their geochemical composition. The GI 21 tephra originates from the Vedivøtn eruption center and might correspond to the Katla tephra identified in the NGRIP ice core at 2631.84 m by Abbot et al. (2012; JQSR). During NAAZ II one known rhyolitic (II-RHY-1) and one tholeiitic (II-Thol-2) tephra were recognized as well as a few grains of unknown tephras. The tephras found within GI 8 belong to the Faeroe Marine Ash Zone (FMAZ) III with tephras FMAZ III-1 and FMAZ III-2 clearly identified. From FMAZ-I the tholeiitic tephra 1 has been found, while the Fugloyarbanki tephra has yet to be detected in the latest samples analyzed. The tephra record from core PS2644 extends the distribution area of known tephras in the marine realm closer to the Greenland margin and will also help to classify more MIS 3 tephras that could be used for correlating climate signals in the various INTIMATE archives.