

Interactive comment on “Northward advection of Atlantic water in the eastern Nordic Seas over the last 3000 yr: a coccolith investigation of volume transport and surface water changes” by C. V. Dylmer et al.

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We are grateful to Dr. A. Kuijpers for reviewing our manuscript and we acknowledge the useful comments and valuable recommendations that will bring substantial improvements to our manuscript. The suggested references are indeed relevant and of importance for the subject of this paper. The paper by D’Andrea et al. (2012) which argues for an early atmospheric warming over western coastal Svalbard as early as 1600 AD is highlighting in view of our coccolith record obtained in core JM09-KA11 (northern Barents Sea). This sediment core is indeed affected by the coastal Polar

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Sorkapp Current, an extension of the East Spitsbergen Current which turns around southern Svalbard and flows over the shelf of western Svalbard, hereby influencing the atmospheric temperatures of coastal western Svalbard. The coherent signals between the D’Andrea’s atmospheric temperature record and the JM09-KA11 record of surface water masses (Fig. 4) can therefore be explained on the sole ground of local circulation features in close vicinity to Svalbard, i.e. influenced by the dynamics of the East Spitsbergen Current. Kinnard’s (2011) reconstructions of Arctic sea-ice over the past 1450 years is particularly coherent with the message given by coccoliths in core HH11-134-BC located far from coastal Svalbard, within the influence of the main core of Atlantic water flow to the Arctic Ocean (West Spitsbergen Current). Particularly relevant are (1) the phasing of the WSC flow pulse between 1540 AD to 1620 AD (our record, Fig. 6 and 7) with a minimum in Arctic ice extent in the late 16th century and early 17th century (Kinnard et al., 2011), (2) followed by deteriorating conditions in both AW flow (our work) and sea-ice extent (Kinnard’s) until the early 20th century. This strongly supports the impact of AW volume flow (as particularly reconstructed in Fram Strait, the main conduit of AW to the Arctic Ocean) on the dynamics of Arctic sea-ice. Both these key additional references (and associated discussions) will be included into the “Discussion” section of our revised manuscript, as well as additional references (as suggested by A. Kuijpers) about paleo-evidences for the NAO-driven so-called “seesaw pattern” in oceanic conditions between the western and the eastern Nordic seas (i.e. Andresen, 2012).

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