Figure 11 The reconstructed summer temperatures after filtering with different band-pass filters: 20-year low-pass values (upper) and 60-year low-pass values (lower).

Figure 12 Regional reconstruction of polar tree-line dynamics on the Yamal Peninsula since 1800 BC. The zero line indicates the position of the recent polar timber-line.

may have been associated with the eruption of the Thera volcano around 1628 BC (Baillie, 1999; Grudt et al., 2000).

During the last 3700 years, five periods of unfavourable climate are evident as minor southward tree-line shifts. The later four of these commenced at around AD 600, 950, 1450 and 1800, all coincident with the onset of severe cool periods as indicated in the temperature inferences based on the ring-width chronology in Figure 11b. The most persistent southward tree-line shift of the last three and a half millennia occurred at around 350 BC and lasted for 350 years. This does not correspond directly with a cold