

## Supplement: Stolleklint Beach Sampling

### *Stolleklint Sampling*

In order to evaluate the lower part of the Stolleklint Clay and underlying strata, we excavated a 43 m long and 0.5 m deep trench in the beach (Figure S1). The sub-beach section appears to have two areas of disturbance: 1) low angle thrusting in between tephra layers #-34 and #-33, which leads to a localized repetition of tephra #-33 that is also observed higher up in the cliff face; 2) overturned folding between tephra layers #-35 and #-34 (Figure S1). The remaining part of the Stolleklint Clay does not appear to be heavily deformed, although some areas are missing the laminations that would display such deformation.

To make a more precise estimate of the thickness of the Stolleklint Clay, we collated dip and strike measurements for each 5 m horizontal interval along the beach and used trigonometry to estimate the true thickness. One way of calibrating the deformed upper section is to compare distances between tephra layers with the uninterrupted stratigraphy of the quarry road-cut section. The quarry outcrop has a thickness of 1.26 m between tephra #-35 and #-34, and 0.68 m between #-34 and #-33. The calculated thicknesses for the sub-beach section are 1.59 m and 0.85 m between the respective tephra layers, about a 25 % increase in estimated thickness. For the purposes of building a complete cross section, we anchor the cross sections at tephra layer #-34 as it is exposed in an undeformed part of the Stolleklint cliff face. This gives an estimated true thickness of the Stolleklint Clay (from basal contact with the Holmehus-Østerrende Clays to the base of tephra #-33) of 24.4 m.

### Figure S1 – Fur Beach Calculations

Dip and strike measurements were averaged at every 5 m intervals, then the estimated true thickness was calculated using trigonometry.

