

The disappearance of a “classical“ ice marginal position in NE-Germany: the Frankfurt phase puzzle

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The Frankfurt phase of the Weichselian glaciation is a classical ice marginal position in the North European plain according to all geological and geomorphological maps since the end of the 19th century. Its detection is based on the connection of prominent, but rather isolated landscape features to a supposed ice margin. As in NE-Germany no till layer is connected to the proposed ice marginal position, it is usually considered to represent an active ice margin which formed during a stability phase of the downwasting from the maximum Weichselian ice extent, the Brandenburg phase, which is located about 60 km further south. This is in contrast to the supposed equivalent of the Frankfurt ice marginal position in Poland, the Poznan phase, which is documented by a more prominent landform record and an associated till.

New investigations and a reinterpretation of the topography, a reevaluation of sediments in sand pits, as well as geochronological data of glaciofluvial sediments give new insights into the glacial processes as well as in the timing. The landscape was widely formed by glaciofluvial processes forming a complex pattern of intercalated outwash sediments of the advancing, as well as of the downwasting glacier of the Brandenburg phase. A detailed study of the topography by LIDAR data gives evidence of a successive ice retreat pattern south of the so called Frankfurt ice marginal area, documented in the form of a differentiated pattern of glaciofluvial sediments and till on top.

An outwash plain, the Müncheberger Sandur, on which several eskers have been mapped, was classically interpreted as a proglacial feature of the Frankfurt ice marginal position. Nevertheless, a series of OSL-ages shows Weichselian ages which are not in accordance with the supposed timing as an outwash plain related to the Frankfurt ice marginal position. The ages, as well as sedimentological evidence suggest that the sandy glaciofluvial sediments belong to the proglacial sediment cycle of the glacier advancing to the Weichselian maximum ice extent further south and that they were overridden by the Brandenburg ice advance. Therefore the eskers must be reinterpreted as kames which were deposited during the downmelting of the inland ice after the Brandenburg phase.

These results provide further evidence that the Frankfurt ice marginal position may rather be a traditional scientific construction based on an over-interpreted landscape record, than a true ice marginal position of the Weichselian glaciation. Based on these findings, the correlation of ice marginal positions from NE-Germany to Poland is still open.