

MSc. Thesis in the Sedimentary Systems research group

“Quantification of a catastrophic submarine Mass Transport Event in the Early Micoene of the Upper Austrian Molasse”

Project Description:

During the Oligocene and Early Miocene, the Upper Austrian Molasse Basin formed a narrow marine basin at the margin of the Paratethys. In the Early Miocene, the submarine strata of the Upper Austrian marine Molasse are characterized by a catastrophic mass wasting event at a large scale (Fig. 1, Hubbard et al., 2009). The laterally isolated occurrences of chaotic lithofacies are associated with mass-transport complexes and represent large raft blocks (several 100 m in diameter). Large raft blocks (several 100 m in diameter) slid down from the southern, tectonically active margin of the basin and into the basin-axial submarine channel belt. The distinct outline of the features in seismic- reflection data indicates that they traveled across the seafloor as coherent blocks. These olistoliths consist of predominantly of fine-grained laminated shale and sandstone. Single blocks are large enough to serve as individual natural gas reservoirs.

In this study, we propose to investigate this basin-wide catastrophic mass wasting and interpret its causes. The MSc candidate will quantify the distribution and volume of the raft blocks by interpretation a large (3300m km²) 3D-seismic reflection cube, well data, and sediment core. Furthermore, we will constrain the temporal occurrence of this large-scale, catastrophic mass wasting events (in cooperation with Gero Fischer).

This project will be primarily supervised by Anne Bernhardt. The MSc student will join a research team (1 PhD student, 2MSc students, 2 professors) investigating different aspects of the Molasse Basin strata. The project is partly financed by the Rohöl-Aufsuchungs AG (RAG). A final presentation of the study results in the RAG headquarters in downtown Vienna will take place in March 2018.

Please apply with a single pdf file including a short letter of motivation (1 page max.) explaining why you are a suitable candidate for this project, a CV, and transcripts to anne.bernhardt@fu-berlin.de.

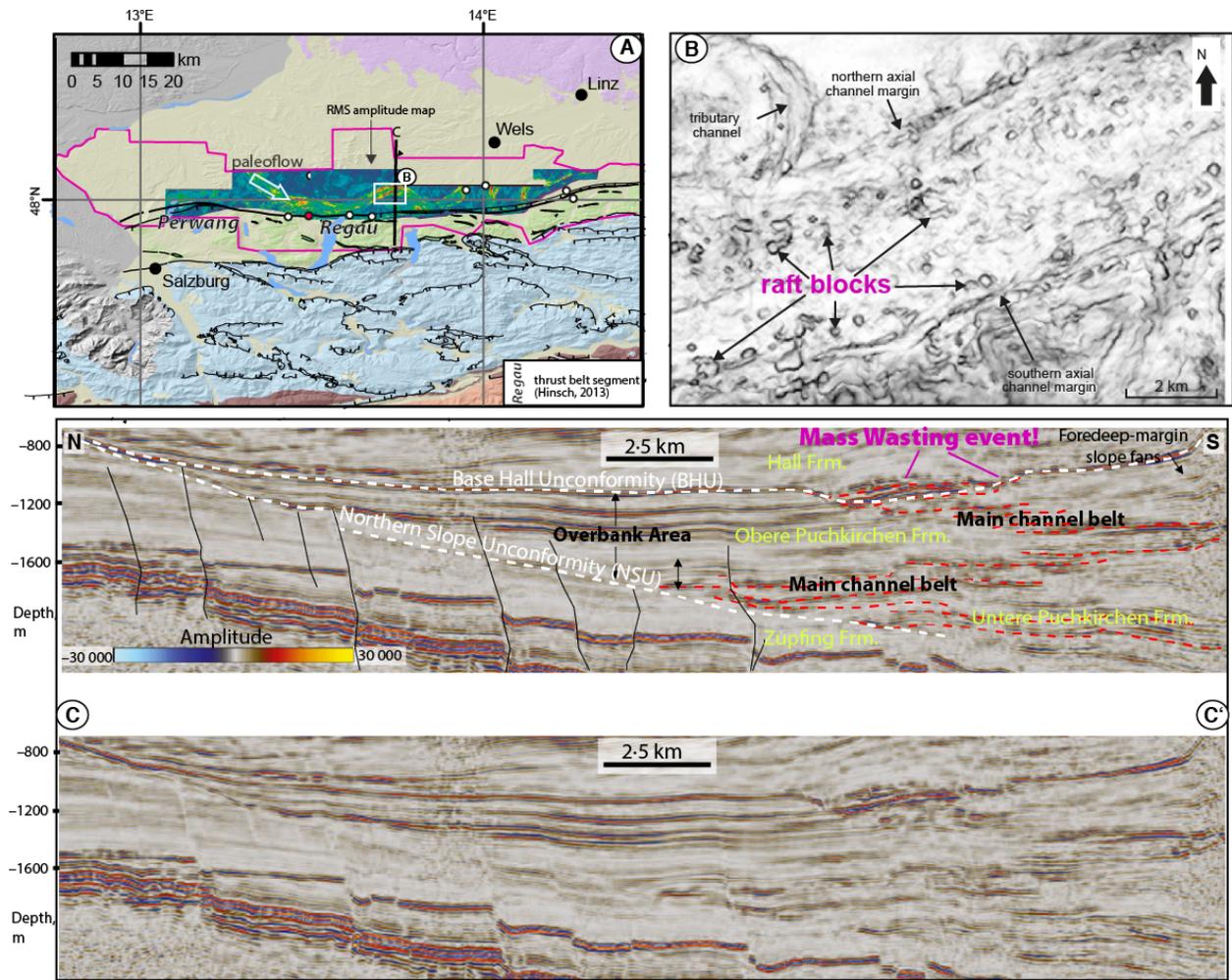


Figure 1. Overview figure of the Upper Austrian Molasse Basin and the available data. A) Basin location and extent of the 3D-seismic cube provided by RAG. B) Large raft blocks (up to 500 m diameter) burying the deep-marine axial channel belt above the BHU (modified from Hubbard et al., 2009). C) Seismic-reflection profile (see A for location) showing the Molasse Basin stratigraphy, the axial channel belt and the major Basin-wide unconformities (BHU and NSU) (modified from Masalimova et al., 2015).

References:

- Hubbard, S.M., DeRuig, M., and Graham, S., 2009, Confined channel-levee complex development in an elongate depo-center: Deep-water Tertiary strata of the Austrian Molasse basin: Marine and Petroleum Geology, v. 26, no. 1, p. 85–112, doi: 10.1016/j.marpetgeo.2007.11.006.
- Masalimova, L.U., Lowe, D.R., McHargue, T., and Derksen, R., 2015, Interplay between an axial channel belt, slope gullies and overbank deposition in the Puchkirchen Formation in the Molasse Basin, Austria: Sedimentology, p. 1717–1748, doi: 10.1111/sed.12201.