3D Geological and Thermal Modelling of the Molasse Basin in Austria

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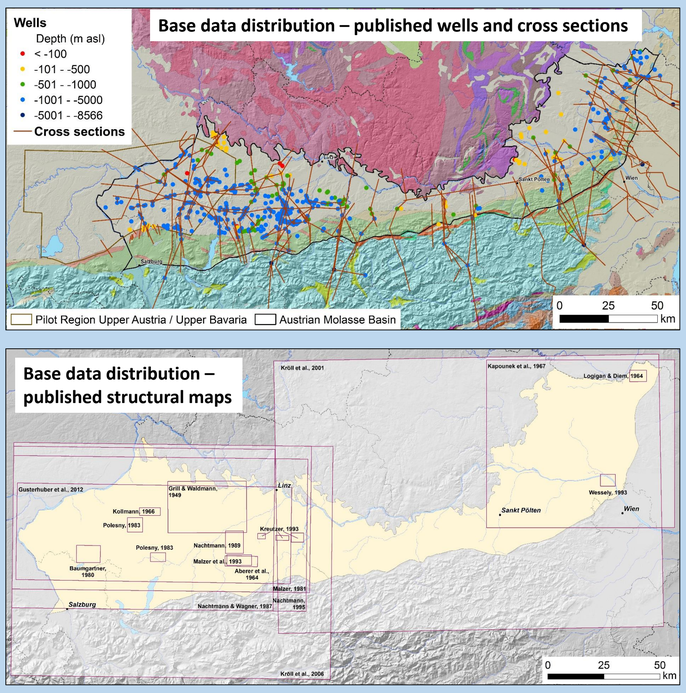
Geological Survey of Austria

Introduction

As part of the EU project GeoMol (www.geomol.eu), geological layers in the Austrian Molasse basin were modelled from ground surface down to the Crystalline.
In a pilot region in Upper Austria / Upper Bavaria, these layers formed the basis for modelling the temperature distribution.

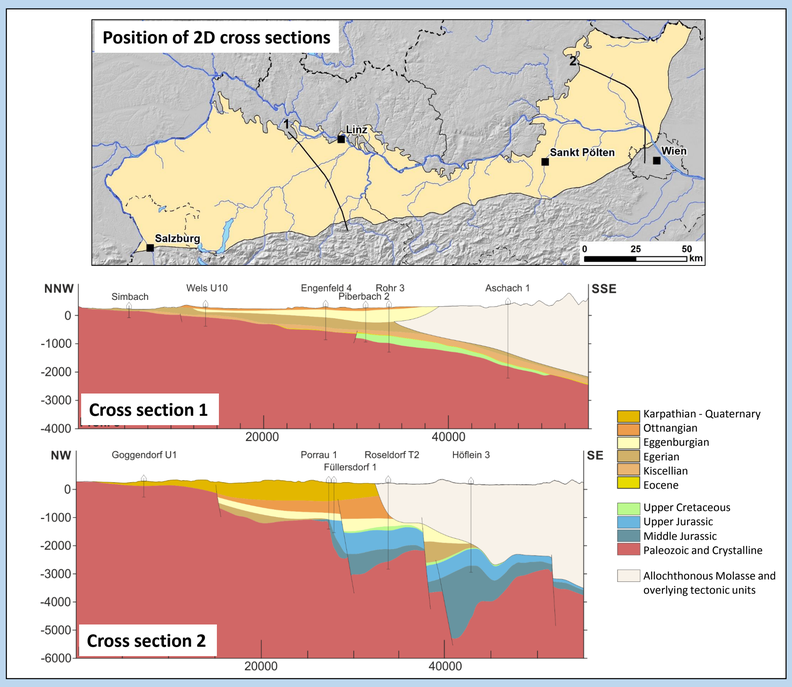


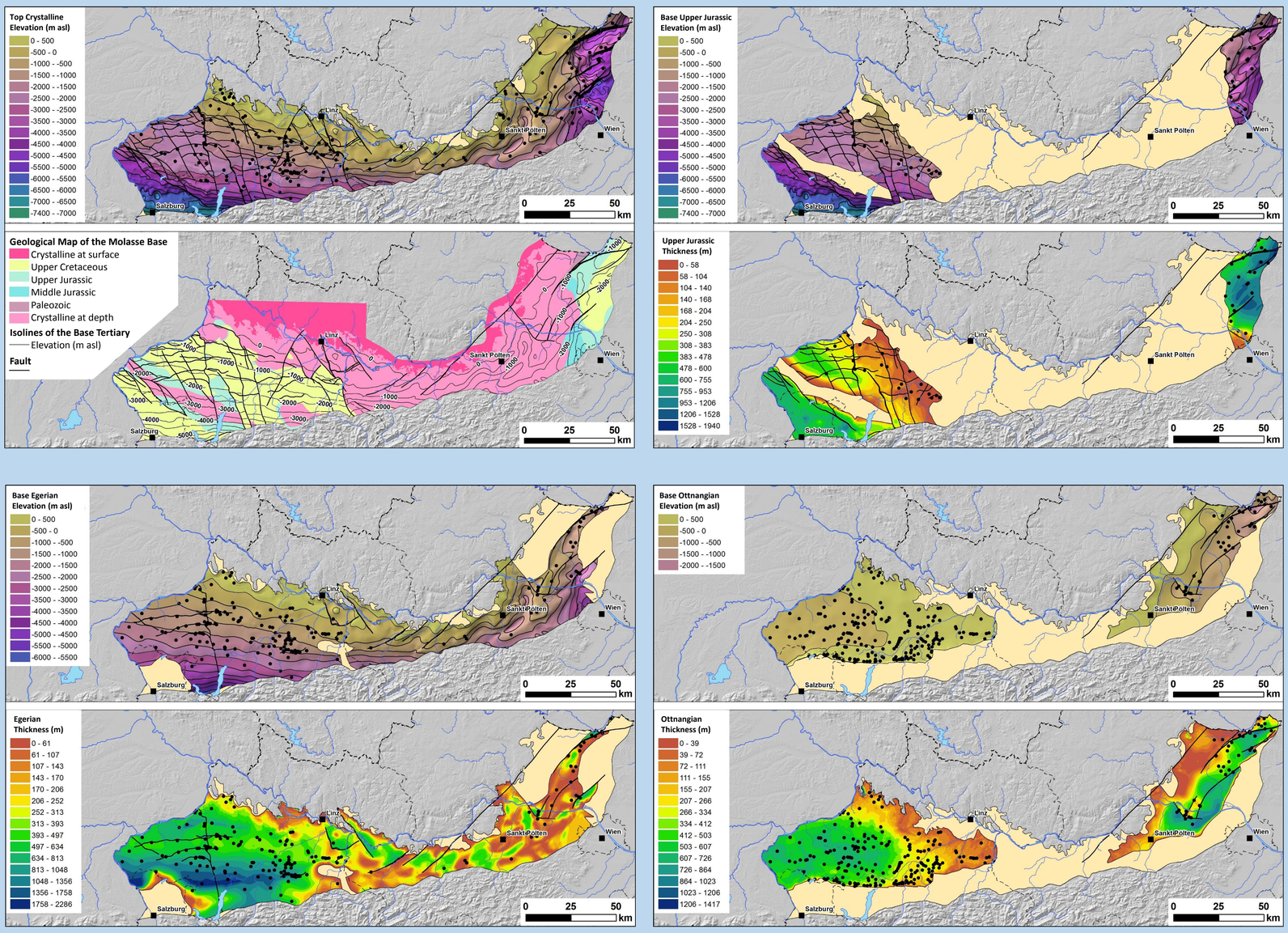
Base Data

Base data for geological modelling included 688 published well logs, 95 unpublished well logs from oil companies, 148 published cross sections (4500 km), 24 structural maps and 65 seismic profiles from oil companies (1300 km).
For geothermal modelling, 1510 temperature measurements were used, 1201 of which bottom hole temperatures.

Geological Model

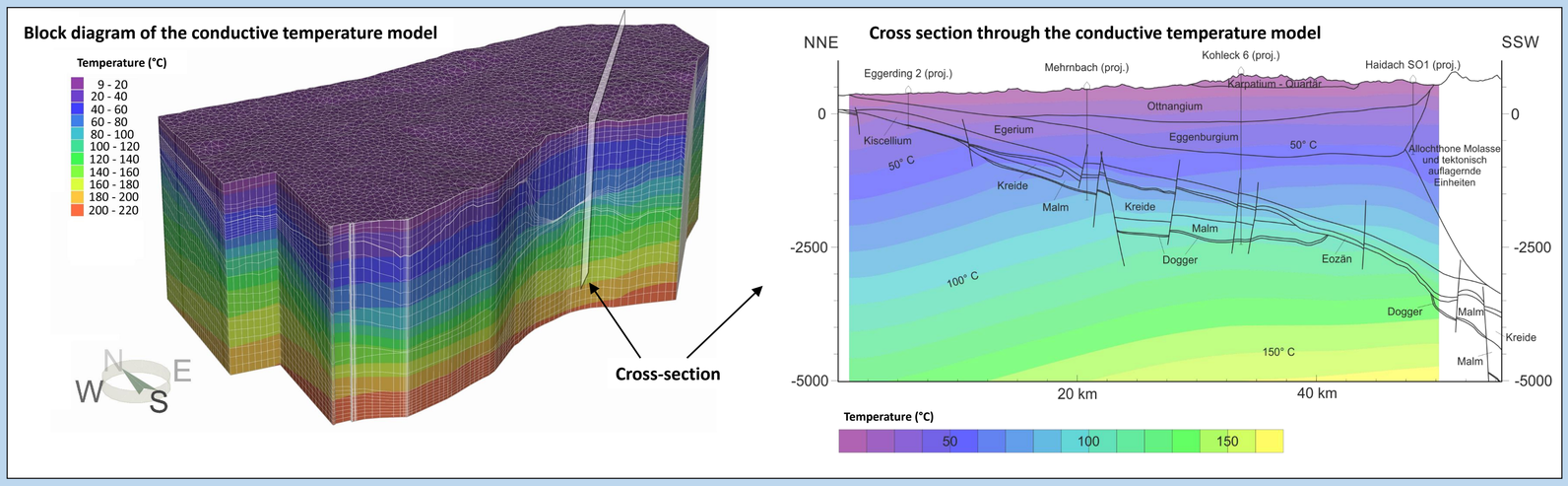
Modelled layers included the bases of the Middle Jurassic, Upper Jurassic, Upper Cretaceous, Eocene, Kiscellian, Egerian, Eggenburgian, Ottnangian and Karpatian, as well as the base of the allochthonous Molasse.





Temperature Model

In the pilot region of Upper Austria / Upper Bavaria, thermal conductivities of the geological layers were estimated and a conductive temperature model was calculated.



Conclusions

For the first time, the entire area of the Austrian Molasse basin was modelled geologically in 3D. The model includes ten units. Compared to previous structural maps, the regional extents of several layers, e.g. Upper Jurassic, were refined. The temperature model in the pilot region allows to define where and at which depth geothermal potential for balneology, direct heating or power generation exists.

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