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Predict depth constraints for lithospheric modelling by machine learning

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Machine learning applications in geophysical studies are often used to predict geophysical observations in areas with sparse or not data or recognize patterns and similarities in data. In our study, we test different techniques to improve the information of constraining data by machine learning and to improve strengthen the modelling of lithospheric structures with potential field data. Constraining data like seismic information, surface geology, rock classifications etc. is often used during the interpretation step of lithospheric modelling to aid the qualitative interpretation. Consensus between additional data and the own model is assessed by comparison and used to describe the model goodness consistency. First Wwe test, how this additional data can be used before the modelling by using machine learning techniques to quantify the data. We focus on supervised learning to predict crustal structure in areas with little constraints, on trained learning in data-rich areas. Second, we test the spatial analysis of surface data to determine lithospheric boundaries in depth. These tests are performed in North America and the Central Asian Orogenic belt (CAOB) to compare the results in areas with respectively good and spare data coverage. That approach can be used to link the large variety of surface and deep information in the CAOB region.

The combination of the different geophysical data available with the geological data should improve our tectonic modelling.