



Vertical plate motions in the West Siberian Basin

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The West Siberian Basin is a sedimentary basin situated between the Ural Mountains and the Siberian Craton. The Basin has experienced several periods of subsidence and uplift since the arrival of the Siberian Traps c. 250 Ma. Although the Basin is extensively explored and hosts large reserves of Oil and Gas, the forces driving the vertical motions are poorly understood. In this work we attempt to analyse the amount, timing and location of subsidence and uplift in the Basin to shed light on the possible causes of these motions.

A detailed description of sedimentary layers is published in a number of Soviet-era books and articles and serves as a basis for our research. This data is first converted into sediment grids through time. Subsequently, the sediments, the sediment load and the compaction are taken into account ('backstripping') to produce the depth of the Basin at respective time steps. With this technique we calculate the tectonic component of subsidence. Uncertainties related to uplift events are estimated by the unconformities in the stratigraphic charts.

One of the possible driving forces of vertical motions is a change of force balance arising at plate boundaries. Since active plate tectonics have been absent from West Siberia since the formation of the Urengoy and Khodosey Rifts, c. 250Ma, we study the far-field tectonic effects as a potential driving mechanism. Indeed, some of the significant vertical events in the West Siberian Basin coincide with the major tectonic events around Siberia. An example is the spreading in the Arctic (Eurasian Basin) in the Eocene (56 Ma) which was synchronous with initiation of uplift events in the northern part of West Siberia. In the middle Oligocene (33 Ma), the northern and eastern parts of the basin were subjected to uplift as subsidence migrated southwards and the Basin rose above the sea level. This was coincident with the changes of plate motions in the northern North Atlantic and Indo-European collision.