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New 3D Finite Element models of the central Andes using realistic geometry

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In the frame of the German research project „Mass transport and mass distribution in the system Earth“ (SPP 1257, funded by the German Research Soc.) we concentrate on a better understanding of the geophysical processes in the South American subduction zone. Therefore high resolution geodynamic 3D models are developed by the Finite Element Method (FEM). The effect of different model parameters, e.g. friction coefficient, oblique convergence, etc., are analysed on generalised models. The geometry plays an important role for the processes along subduction zones. Therefore models of the central part of the Andes are developed with geometries taken from well constrained gravity models. Hence, the geometry is more realistic than in generalised models. The combination of gravity field and FE-modelling provides new insights into geophysical processes on subduction zones. For different model rheologies (elastic, viscous-elastic, etc.) the stress- and deformation field is calculated. The comparison between the resulted stress field and earthquake regions shows that the distribution of earthquakes is strongly correlated with stress field patterns along the Andes.
New satellite gravity data will improve the mass distribution models by closing the gaps of the terrestrial data. By adopting the geometries from these models for the geodynamic simulations the results will improve.