The nature of the North-South change of the magnitude of tectonic shortening in Central Andes at Altiplano-Puna latitudes: a thermomechanical modeling approach.

Michaël Pons
(ponsm@gfz-potsdam.de)
GFZ Helmholtz-Zentrum Potsdam

• Stephan Sobolev
  GFZ Helmholtz-Zentrum Potsdam

• Sibiao Liu
  GFZ Helmholtz-Zentrum Potsdam

• Constanza Rodriguez Piceda
  GFZ Helmholtz-Zentrum Potsdam

• Anne Glerum
  GFZ Helmholtz-Zentrum Potsdam

While an orogeny typically involves the collision of 2 continental plates, the Andean orogeny formed in a context of subduction, with the oceanic Nazca Plate sinking under the continental South American Plate. Whereas the subduction has been active since ~180 Ma, the shortening of the Andes initiated at ~50 Ma. Moreover, the ~300 km shortening in the Central Andes in Altiplano at about ~19-21°S contrasts with less than 100 km shortening at ~15°S and ~25°S. This raises the question of the cause of change of the shortening magnitude. We hypothesize that the difference in the strength of the upper plate causes differences in tectonic styles resulting in variable rates of trench roll-back. The parameters that weakened the continental plate and controlled the tectonic style of the foreland deformation (thin-skin, thick-skin) were investigated previously, without regarding the subduction. This project aims to build on previous work by using the Advanced Solver for Problems in Earth’s ConvecTion (ASPECT) to numerically simulate 2D and 3D visco-plastic models of the interaction of the subducting Nazca plate and overriding South America plate. First, we will run high-resolution 2D East-West cross sections along the Altiplano and Puna latitudes. Second, we plan to extend the previous cross-sections to a 3D model of the entire region. Finally, we will update the 3D model of the lithospheric
structure in the Puna region developed by our partner project. This project is supported by the International Research Training Group StRATEGy.