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Changing material properties across the south central Chile forearc and impact on seismogenic zone behaviour

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The position of the seismogenic zone and the processes within and around it are determined by the material within the subduction channel. Material properties are influenced by changing temperature and pressures, and by the composition. The joint TIPTEQ-projects, which focus on petrophysics and process simulation of the Southern Chile subduction zone, enable to investigate the material properties and their changes from the sedimentary material potentially entering the subduction channel down to the downdip end of the seismogenic zone, and through high temperature high pressure laboratory experiments even deeper. Information on material properties is reflected in thermal and mechanical numerical model simulations, which then are validated with the help of geophysical data acquired by the other TIPTEQ projects. Here we present a summary of material properties relevant for the seismogenic processes and how they change during subduction material transport. There is evidence, for example, that rock frictional properties of sedimentary material that is fed into the subduction zone varies is space, along with mineral composition. For time-dependent changes, our numerical simulations suggest that the drop of friction along the plate interface has a major impact on the mechanical behaviour of the forearc. High temperature, high pressure laboratory experiments underline the importance of water in influencing key physical properties. Seismic events detected in dehydration experiments emphasize the capacity of such metamorphic reactions as earthquake generators. The joint interpretation based on geophysical data, laboratory experiments and numerical simulation is the

base for a better understanding of seismogenesis at the Southern Chile convergent plate margin.