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Subduction obliquity as a prime indicator for geotherm in subduction zone

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The geotherm of a subduction zone is thought to vary as a function of subduction rate and the age of the subducting lithosphere. Along a single subduction zone the rate of subduction can strongly vary due to changes in the angle between the trench and the plate convergence vector, namely the subduction obliquity. This phenomenon is observed all around the Pacific (*i.e.,* Marianna, South America, Aleutian...). However due to observed differences in subducting lithosphere age or lateral convergence rate in nature, the quantification of temperature variation due to obliquity is not obvious. In order to investigate this effect, 3D generic numerical models were carried out using the finite element code ELEFANT. We designed a simplified setup to avoid interaction with other parameters. An ocean/ocean subduction setting was chosen and the domain is represented by a $800 \times 300 \times 200$ km Cartesian box. The trench geometry is prescribed by means of a simple arc-tangent function. Velocity of the subducting lithosphere is prescribed using the analytical solution for corner flow and only the energy conservation equation is solved in the domain. Results are analysed after steady state is reached.

First results show that the effect of the trench curvature on the geotherm with respect to the convergence direction is not negligible. A small obliquity yields isotherms which are very slightly deflected upwards where the obliquity is maximum. With an angle of $\sim 30^\circ$, the isotherms are deflected upwards of about 10 kilometres. Strong obliquity (*i.e.,* angles from 60° to almost 90°) reveal extreme effects of the position of the isotherms. Further model will include other parameter as the dip of the slab and convergence rate to highlight their relative influence on the geotherm of subduction zone.