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How the roughness of seaflor affects the morphology and structure of accretionary prism?

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We use open source thermomechanical code pTatin2d to simulate the formation of accretionary prism. The originality of the approach relies on basal heat-flow boundary condition which allows modelling the effect of thermally controlled rheological transition within the accretionary complex. This includes illite-smectite transition and its effect on friction but also the capacity for the bulk of the structural units to deform in a ductile manner when temperature increases. The code also features flexural boundary conditions at the base to reflect the effect of regional isostasy as a function of the strength of the subducting plate. Thanks to all these features, we can couple the models with surface processes and get post-process cooling age in the exhumed units. The 2D simulations we present are calibrated using the parameters of the Manila trench and the geometry of the seafloor at different latitude along the trench. We show how the roughness of the seafloor may cause episodic phase of erosion followed by new accretion phase resulting in the formation of the new accretionary units and we compare the results with seismic data to propose some new interpretation of the structures they highlights.

Keywords: Numerical modelling; accretionary prisms; Manila Trench; basal erosion; frontal accretion