

Interactive comment on “The effect of obliquity on temperature in subduction zones: insights from 3D numerical modeling” by Alexis Plunder et al.

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Plunder and co-authors have addressed the role of subduction obliquity in modifying the slab thermal structure. They found that trench-parallel (toroidal) component of the subduction-induced mantle flow can generate from 50° to 200° along-strike temperature differences according to the subduction velocity, and, more importantly, the subduction obliquity.

The manuscript represent a substantial contribution to scientific progress within the scope of Solid Earth, as it suggests that along-strike variations in the degree of metamorphism in exhumed rocks (assuming that the pressure represent depth and no important contribution derives from tectonic stresses) could be explained by subduction

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obliquity.

The scientific approach and applied methods are valid, and the model limitations are fairly discussed. Results are concise and clearly explained.

The only major comment I have is that, in order to make the paper more appealing to a wider geological and geophysical audience, may be the authors could have investigated how the results change as a function of the (i) slab dip (for example, 30-60-90 degrees), (ii) slab age (for example, 50-75-100 Myr) and (iii) upper plate age (5 Myr is a quite unusual age for the upper plate where oceanic plates subduct below overriding continents). In this way the results could be more applicable to different subduction settings, and successively could be further tested in another study by introducing further complications like dehydration and melting reactions, temperature- and composition-dependent viscosity, etc.

Aside this, I recommend publication of the paper in the present form.

â€” Page 7, line 10: typos. â€” Page, line 25: $v_y/v = 2.55/30 = 8.47\%$. Why 2.9%?
â€” Page 10, line 26: typo

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