Review of the revised version of "Assessing the role of thermal disequilibrium in the evolution of the lithosphere-asthenosphere boundary: An idealized model of heatexchange during channelized melt-transport"

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A revised version has been submitted in which all points and concerns of my previous review have been properly addressed. The manuscript has improved significantly. Very nicely the effect of axial diffusion is included and discussed now, and the discussion about the energy budget has been improved. I detected only one point which would confuse the reader:

Your definition of Peclet numbers (eq. 8 – 10) is strange. You use a length scale l defined as the product of an advection velocity and a diffusion time t_f of channel width. Usually the Peclet number should give the ratio of an advective length scale divided by a diffusive length scale (both per time). Writing the characteristic diffusion time across a channel as $t_f = d_{channel}^2/\kappa_f$, your definition reads as

$$Pe_1 = \frac{v_{channel} l}{\kappa_f} = \frac{v_{channel}^2 t_f}{\kappa_f} = \frac{v_{channel}^2 d_{channel}^2}{\kappa_f^2} = Pe_{channel}^2$$

where κ_f is the fluid diffusivity, $d_{channel}$ is the channel width and $Pe_{channel}$ is a Peclet number based on advection through the channel and diffusion across the channel. The same argument applies to your second Peclet number which seems to be the square of a Peclet number base on advection along the channels and diffusion across the grains (solid). Thus your definitions are no real Peclet numbers sensu stricto. I suggest to use alternative definitions (such as $Pe_{channel}$ above, see also definitions in my previous review) even though they may be smaller than the ones you used in the manuscript now.

Line 222: Missing ")"