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# The Role of small-scale Convection on the Characteristics of seismic Anisotropy below oceanic Lithosphere

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Seismic anisotropy has been proven a valuable tool to determine rheology and flow properties in the Earth's asthenosphere. However, the relationship between flow and the nature of seismic anisotropy is complicated and depends on cumulative strain and rheological properties such as dynamic recrystallization, and even simple shear experiments show non-trivial fabric developments (e.g. Zhang & Karato, 1995; Wenk and Tome, 1999; Kaminski and Ribe, 2001).

Several studies indicate that the amplitude of seismic anisotropy in the old Pacific is small compared to that in the young Pacific (Nishimura and Forsyth, 1989; Becker et al.,2003; Smith et al., 2004). This suggests that the built-up seismic anisotropy is somehow destroyed during ageing of the plate. Here we examine how small-scale sublithospheric convection (SSC) influences the amplitude fabric under older oceanic lithosphere. SSC probably occurs below Pacific lithosphere older than ~70 Ma. Our results show that SSC can occur as regular roll structures, but also as chaotic convection below the lithosphere. This suggests that SSC is capable of destroying fabric, but also of forming new structures. In this study, numerical modeling of fabric formation (using D-Rex by Kaminski and Ribe, 2002) by mantle flow (using Citcom) is performed to verify these hypotheses. Maps of seismic anisotropy suggest that the oldest parts of the Pacific lithosphere have a preferred orientation of the seismic velocities that align with the (frozen-in) paleo-spreading direction at shallow depth, or with the present-day plate motion in deeper portions of the lithosphere (Nishimura and Forsyth,1989; Smith et al., 2004). Here, we show the influence of a sudden change in plate motion direction on the fabric formation below, and the role of SSC in this procedure.