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Seismic anisotropy in the south western pacific region from shear wave splitting

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We perform shear-wave splitting measurements to determine seismic anisotropy in the upper mantle under the remote and still not well-understood South Western Pacific Region, more precisely the New Hebrides subduction zone. We obtained 29 good and 35 fair splitting measurements at 8 stations and 91 good and fair Null measurements from the data provided by various networks. According to the splitting parameters, the seismic stations are grouped into "eastern" and "western" stations. Anisotropy of the subducting plate ("western" stations) appears to be the result of absolute plate motion (APM) of the Australian plate. From fast orientations alone, it would be difficult to judge which process is responsible for the anisotropic structure: either the absolute plate motion or trench-parallel "toroidal" flow. Their delay times reveal that these anisotropic parameters can be explained without the presence of the subduction zone, and the APM provides a simple explanation for the observed anisotropy. On the other hand, delay times at "eastern" stations are higher than that of "western" stations. These stations are located close to the subduction zone, and the nearly trench-parallel orientation of fast polarization axes and their higher splitting delay times indicate the presence of subduction zone. Anisotropy at "eastern" stations is apparently due to the additional effect from "toroidal" flow near the subduction zone, which increases the total anisotropy.