

Thermal structure and water transportation in subduction zones: a comparison between NE and SW Japan

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Northeastern and southwestern Japan are considered to be typical examples of cold and hot subduction zones, respectively. The old Pacific plate subducts beneath northeastern Japan at high rate and the young Philippine Sea plate subducts beneath southwestern Japan at low rate. These contrasts in the subduction conditions reveals in several aspects including higher activity of arc volcanism and deeper down dip limit of inter-plate earthquake in northeastern Japan, and deep low-frequency tremors at plate boundary of southwestern Japan. We have investigated thermal structure and geophysical and geochemical processes in these subduction zones using a numerical model. The model includes hydration and dehydration of the slab and mantle wedge, melting and solidification of mantle peridotites, permeable flow of melt and aqueous fluids, and temperature-dependent solid flow of mantle peridotites with water- and melt-induced weakening. We will discuss effects of the subduction conditions on the volcanic and seismic activities through the processes, especially water transportation.

Keywords: subduction zones, NE Japan nad SW Japan