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Why does a belt of low-frequency earthquakes in western Japan have gaps?

Noriko Kamaya^{1*}, Shingo Utsunomiya¹, Akio Katsumata²

¹Meteorological College, ²Meteorological Research Institute, JMA

Low-frequency earthquakes (LFEs) in southern Nagano Prefecture have been detected by using automatic detection program on the basis of waveform correlation method (Brown et al., 2008). The epicenters have been plotted as a northern extension of a belt of LFEs detected by JMA. However, no LFE has been detected in further north and further east area. This means that LFEs are not observed but do not occur in those areas. Epicenter distribution and a phase diagram of hydrous basalt (Hacker et al., 2003) indicate that temperature on upper surface of the Philippine Sea Slab would be low in those area. Deep Moho (Katsumata, 2010) and low terrestrial heat flow (AIST, 2004) support this idea. A belt of LFEs also has gaps around Ise bay and eastern Ehime Prefecture. In these area, water generated by dehydration of oceanic crust on the Philippine Sea Slab is considered to be absorbed by mantle wedge, because depth of Moho is shallow. This would be a reason why there are gaps. In Kanto area, LFEs are not observed even though the Philippine Sea Slab subducts as same as western Japan. Low temperature of the slab would be a reason of it, which is supported by low terrestrial heat flow (AIST, 2004).

Keywords: Low-frequency earthquake, Low-frequency tremor, dehydration, Philippine Sea Plate, Kanto area