Does Cenozoic tectonics in NE Asia need the deep dehydraiton of the stagnat Pacific Plate?

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It is considered that hydrous components derived from the stagnant Pacific Plate at the mantle transition zone would play significant roles in the Cenozoic tectonics of East Asia. From the viewpoint of mineralogy, petrology and geology, the deep dehydration model has numbers of critical oversights.
The serpentinized mantle would be formed by additions of H_2O from the subducting slab at the base of the mantle wedge. In order to bring H_2O into the deep mantle, the serpentinized mantle should subduct with the slab to 6 GPa where dense hydrous silicate minerals are stable. Properties of serpentinite, a main mineral of serpentine, indicate the difficulty of the serpentinized mantle subduction. The density of serpentinite is significantly lower than that of olivine. The serpentinized mantle therefore could not subduct because of its buoyancy. The slab drag is required to subduct the serpentinized mantle. Mechanical strength of serpentinite, however, is weaker than olivine, which indicates that the serpentinite mantle would behave as a slip plain to the slab drag. The slab drag therefore would not effectively act on the serpentinized mantle.
Central Japan, where the oldest part of the Pacific plate and the young Philippine Sea plate doubly subduct, is regarded as the place where serpentinized mantle could subduct to 6 GPa. The trench orientation of the Pacific Plate, however, turns from NNE-SSW to N-S there, which indicates that a slab window would be opened by the strike-parallel tensional stress there. A slab window enables penetration of sub-slab mantle into the mantle wedge to increase its temperature. The retreat of the volcanic front to the back-arc side there would be the result of the bending of geological structures by the collision of the Izu-Bonin Arc to Central Japan.
Geochemical characteristics, such as the negative Nb anomaly, of the San' in basalts from SW Japan are considered as definite evidence for the deep dehydration. The estimated H_2O content (1.5 wt. %) for the basalt, however, is similar to that in OIB-type basalt such as Hawaii. The geochemical feature could also be explained by involvement of sub-arc lithosphere into the source mantle, since SW Japan is essentially composed of accreted oceanic materials. The relationship between the geochemistry of volcanic rocks and the Kyushu-Palau Ridge in Kyushu indicates that geochemistry is essentially controlled by arc lithosphere rather than hydrous components derived from the slab.
Lithospheric weakening by the deep dehydration is considered to have caused lithospheric thinning in Northeastern Asia. Numbers of strike-slip faults, such as Tan-Lu, however, strike there. These strike-slip faults already existed before than the start of the lithospheric thinning. The grain size reduction by strike-slip shear would weaken the strength of the lithosphere. Reactions induced by horizontal extension would also reduce grain size to weaken the lithosphere. Shear-driven melting would concentrate mantle upwelling to the lithospheric weak zone, which would cause further weakening and thinning of the lithosphere.
As pointed above, researches proposing the deep dehydration model have numbers of critical oversights in mineralogy, petrology and geology. The body of evidence obtained from East Asia and interdisciplinary considerations indicate that geological phenomena observed there would be explained by shallow mantle processes such as transtensional tectonics.

Keywords: hydration weakening of lithosphere, stagnant slab, serpentine diapir, choke point of H2O, strike-slip tectonics, grain size reduction

