



Wadati-Benioff zones

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Earthquakes are not uniformly distributed either along mountain belts and arcs or in depth. The zones in which the deeper earthquakes originate are shown, and their regional and global context is examined. The characteristic inhomogeneous pattern is inspected in the Italian region as well on a Mediterranean and global scale.

Real Wadati-Benioff zones do not correspond to what is prescribed by plate tectonic theory, and to what we expect to see having in mind the typical two-dimensional plate tectonic diagrams. In these classical vertical sections - perpendicular to the trenches and arcs - well-aligned hypocenters are shown dipping with a slope around 45° . Abandoning the classical 2-D images, if 3-D plots of the hypocenters of very large areas are drawn, filaments or clusters of hypocentres are recognizable instead of a regular pattern (data from the catalogue of the relocated events by Engdahl et al., 1998). These filaments are real features of the hypocenters' distribution because their separation can easily reach the order of magnitude of degrees. The clusters have the tendency to taper to depth, leading to the idea of an origin in a narrow region of disturbance, which becomes progressively larger toward the surface. Instead of suggesting the downgoing slab of subduction, they evoke the image of trees, or smoke coming out of chimneys. If these filaments are taken as basic features to be explained in constructing new scheme for the Wadati-Benioff zones, it would almost be necessary to build a mechanism in which there is no place for a downgoing slab. It seems more credible that an upward migration of matter or energy (wide sense) would be involved in these zones.