

Abstract

Contribution to the tectonic interpretation of the seismicity pattern of the Banda Arc, Southeast Asia

Tectonic structure of the Banda Arc in Southeast Asia is regarded as an extremely complicated unit as it is situated at the intersection of four lithospheric plates: Eurasian, Indo-Australian, Pacific, and Philippine. The present-day tectonic regime is arc-continent collision. The seismotectonic pattern of the Banda Arc region was studied using global seismological data. Relocated EHB hypocentral determinations for the period 1964 – 2004 and fault plane solutions of Harvard CMT data for the period 1976 – 2004 have been used. The analysis of spatial distribution of earthquake foci and the analysis of focal mechanisms enabled to distinguish the foci belonging to the Wadati-Benioff zone of the subducting plate from those occurring in the overriding plate. The analysis discriminated two opposite dipping subduction zones – southern Banda subduction and northern Seram subduction. The following specific phenomena were observed in the Wadati-Benioff zone: (i) unusual lateral bent of the Wadati-Benioff zone of the southern Banda subduction, (ii) intermediate-depth (100 – 220 km), vertically situated domain of the highest seismicity within the Wadati-Benioff zone of the southern Banda subduction, (iii) segment of shallow seismicity with uniform reverse focal mechanisms within the Wadati-Benioff zone of the northern Seram subduction, (iv) collision of two opposite dipping plates at the depth of their maximum penetration at about 400 km, (v) lack of seismicity beneath the Timor island. Earthquakes within the overriding plate are connected with magmatic activity beneath active volcanoes and with fault zones induced by the process of subduction.