

## Classification of subduction zones based on the spatial correlation of topography, gravity anomaly and volcanic front

FUKAHATA, Yukitoshi<sup>1\*</sup>

<sup>1</sup>Disaster Prevention Research Institute, Kyoto University

In order to understand the diversity and complexity of subduction zones, Uyeda (1982) proposed a classification of subduction zones with end-members of Andean type and Mariana type. This classification is widely accepted and we often see it even in standard textbooks. However, this classification does not always reflect the real subduction zone characteristics. For example, we cannot see the correlation between the slab age and slab dip angle (Lallemant et al., 2005). How should we classify a subduction zone like Tohoku arc, which is very old but has a low dip angle?

The most conspicuous features of subduction zones are topography, gravity anomalies, and volcanism, other than seismicity. Their strikes are basically parallel to the trench. So, based on the spatial correlation among the topography, gravity anomalies, and volcanic front in island arcs, subduction zones can be classified. Before classification, I eliminated the subduction zones that have large variation in topography and/or gravity anomalies along the trench, have an obscure and/or oblique volcanic front, and are nearby ridge subduction. The total number of subduction zones classified is 30. Theories that constitute the background of this study are a kinematic plate subduction model (Matsu'ura & Sato, 1989) that well explains the characteristics of topography and gravity anomaly in subduction zones (low in trench and high in arc and outer rise), and a study for the location of volcanic front on arcs (England et al., 2004) that clarified the importance of thermal structure on this problem.

The result of the classification is as follows. Type I: volcanic front coincides with high gravity anomaly and topography in the fore-arc; Type II-a: volcanic front locates in the back-arc and coincides with high topography; Type II-b: volcanic front locates in the back-arc and does not coincides with high topography. The number of subduction zones for each type is 6, 12, and 6, respectively. All subduction zones classified to type I are oceanic, while all subduction zones classified type II-a are continental except for Kuril. Other interesting characteristics are also found.

Keywords: subduction zone, island arc, topography, gravity anomaly, volcanic front