

Chemical geodynamics in subduction zone: Implications from arc magmas

JUN-ICHI KIMURA¹

¹JAMSTEC, Natsushima-Cho 2-15, Yokosuka 237-0061, Japan; jkimura@jamstec.go.jp

Arc magmas are hydrous and rich in water-mobile elements reflecting water from the subducted oceanic plate and subsequent hydrous melting of the mantle. Arc magmatism is a complex process occurring in such the dynamic system with the enigmatic water-bearing chemical reactions. This presentation aims to describe the processes of arc magma genesis based on chemical mass balance between the magmas and their source materials. The petrology/geochemistry-based mass balance model, Arc Basalt Simulator ver. 4, uses elemental-isotopic compositions and explores intensive-extensive parameters which control the chemistries. The determined parameters are then used to constrain the genetic conditions of 1. Slab dehydration/melting and slab liquid, 2. Slab flux transport in the mantle wedge 3. Flux melting of the mantle, 4. Conditions of the arc slab and mantle, 5. Dynamics in the mantle wedge.

The examinations focus on the contrasting NE and SW Japan arcs where the globally coldest and the hottest endmember subductions are taking place.

