

First Collided Arc Segment in the Active Arc-Arc Collision Zone of the South Fossa Magna, Central Japan

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The South Fossa Magna, central Japan, has been hypothesized as an active arc-arc collision zone, consisting of four possible collided island arc segments or 'blocks' which belonged to the paleo-Izu-Bonin arc, and accreted to the Honshu arc. We present here the results of a study on the first collided block; the Kushigatayama block.

Detailed mapping and facies analyses have revealed that this block represents a segment of forearc, consisting predominantly of volcanoclastic debrites and turbidites. Quench fragmentation of syn-volcanic basalt to andesite arc tholeiite lava, generated hyaloclastite and peperite, which were rapidly resedimented by debris flows and turbidity currents. Subaqueous pyroclastic flow deposits infer the existence of concurrent explosive eruptions of andesite to dacite arc calc-alkaline lavas that are now missing from the geological record. We estimate that the calc-alkaline lavas were part of the main volcanic arc.

The Kushigatayama block is associated with epiclastic fine- to coarse-grained turbidites, which are distributed on the west side of the block, in the Momonoki region. Clasts of the coarse-grained turbidites originated from both the Kushigatayama block, and the Honshu arc. Upward-coarsening sequences, and paleo-flow directions of the turbidites, suggest that the Momonoki region is a trough fill that formed rapidly between the Kushigatayama block and the Honshu arc, during the collision.