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Lithospheric transection of southwest Japan : Results of the 2002 integrated seismic experiment "Southwest Japan"

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A multi-purpose seismic experiment was conducted in 2002 along the more-than-120-km-long line which transected all geologic constituents of the superficial southwest Japan. The experiment, named the 2002 integrated seismic experiment 'Southwest Japan' provided successfully the first lithospheric transection of the southwest Japanese island. The transection gives the following important information on the structural development of the Japanese island arc.

1. The Japanese island arc is divided into the two zones, the Outer and the Inner, by the MTL which dips at about 30 degrees N and cuts the whole crust.

2. The whole upper crust of the Inner zone is characterized by the horizontal structure which is expressed as the nappe structure at and near the surface, whereas that of the Outer zone by the N-dipping accretionary complexes.

3. The thick lower crust occurs in the main part of the Inner zone, whereas no lower crust in the main part of the Outer zone. The Moho of the Inner zone is considerably deeper than the Moho estimated by seismic refraction studies. This may indicate olivine cumulate exists widely in the bottom of the lower crust.

4. The hanging wall of the MTL, which belongs to the southern border of the Inner zone, is structurally characterized by (1) antithetic structure in the upper crust, and (2)thinning of the lower crust. This suggests the (trans?)extension tectonics occurred associated with the initial activity of the MTL

5. The Philippine Sea plate (PHS) changes its subducting angle from 10 to 25 degrees around the junction between the PHS and the lower crust of the northern border of the Outer zone.