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Relocation of earthquake swarm distribution in the south Okinawa Trough using double-difference method

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The south Okinawa Trough is distributed at the 100 km northwest of the Ryukyu arc, which is in the rifting stage with extension. The earthquake swarms with the maximum earthquake magnitude of 6 frequently occur along the axis of the south Okinawa Trough. The accuracy of the hypocenter distribution is not good along the axis of the Okinawa Trough because the hypocenters are about 100 km far from the local seismic network of the Japan Meteorological Agency (JMA).

I determined the locations of the hypocenters along the axis of the south Okinawa Trough using the combination of local and tele-seismic network data. The hypocenter determination was employed using the double-difference technique. The catalogued data of the local seismic network (JMA) and tele-seismic network (ISC catalogue) were used. The P and S arrival time at the station whose epicentral distance is within 90 degrees were used for the hypocenter determination. The earthquakes which occurred between January 1st, 2002 and October 31, 2002 and whose magnitudes are over 3.5 were used for the relocation.

The results show that the each strike and dip of the earthquake swarm along the south Okinawa Trough is complicated. The seismic plane of the earthquake swarm of July 2002 are striking east-northeast direction and dipping northward, while the seismic plane of the earthquake swarm of October 2002 is striking east-west direction and dipping southward. These are consistent with the strike and dip of the normal faults estimated from seafloor topography.

Keywords: Okinawa Trough, hypocenter determination, earthquake swarm