

Paleostress history since Paleogene of the NE Amakusa Islands, Kumamoto prefecture, using fault-slip analysis

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Paleogene inner arc basins are distributed in the northwest Kyushu, which is a key locality to understand an intra-arc deformation before and during the Japan Sea opening. In particular, Amakusa Islands where located at west Kyushu is characterized by NE-SW trending fold structure which formed at the Early Miocene. We applied a stress tensor inversion technique using mesoscale fault-slip data obtained from the Paleogene sedimentary rocks in the northeastern part of the islands.

As a result, three significance stresses (stress A, stress B, and stress C) were found from the fault-slip data. Stress A is normal faulting regime of stress with NE-SW trending minimum principal stress axis and medium stress ratio. Stress B has maximum and minimum principal stress axes in the azimuth and plunges at around 310°/50° and 170°/40°, respectively, and is higher stress ratio. Stress C is strike-slip faulting regime of stress with NW-SE trending maximum principal stress axis and medium stress ratio. We also investigate relative timing of formation between the fold structure and minor faults by stepwise bedding tilt correction of fault-slip data. Results of the tilt correction indicate that most normal faulting in the study area were occurred before or the early stage of folding and strike-slip faulting were occurred in the late stage of or after folding.

These stresses seems discordant with the folding in this area, because folding generally causes horizontal shortening and vertical extension of a sedimentary package. One possible is that fold-axis parallel extension was accompanied by the folding. Another possible is that the normal and strike-slip faulting are independent events before and after the folding, respectively. In that case, the normal faulting is concordant with deformation related to the formation of the Paleogene inner arc basins in the northwest Kyushu. And the strike-slip faulting may correspond to compressional stress of the SW Japan Arc after Japan Sea opening.

Keywords: stress inversion, minor fault, Amakusa, Kyushu