

New age constraints on counter-clockwise rotation of NE Japan

Ayumi Baba[1]; Tetsumaru Itaya[2]; Masahiko Yokoyama[3]; # Yo-ichiro Otofujii[4]

[1] none; [2] RINS, Okayama Univ. of Sci.; Earth Planet. System Sci., Kobe Univ.; [3] Earth & Planetary Sciences at Kobe Univ.; [4] Earth and planetary Sci., Kobe Univ.

Miocene basaltic-andesitic lavas and Cretaceous granites were sampled in the Abukuma Terrane of northeast Honshu for geochronological and palaeomagnetic studies to determine precise timing of counter-clockwise rotation of NE Japan. Characteristic component with unblocking temperature of 560°C-590°C is isolated from 26 sites of Takadate and Ryozen Formations as well as from 12 sites of the Cretaceous granites. Concordant northwesterly declinations ($D=265^{\circ}$ - 331°) are observed in the Cretaceous granites throughout the Abukuma Terrane. Mean Cretaceous palaeomagnetic direction for the Abukuma Terrane ($D=313.5^{\circ}$, $I=54.6^{\circ}$, $\alpha_{95}=6.3^{\circ}$, $N=20$) is almost identical to 33-20Ma palaeomagnetic direction of the Japan sea side as well as Cretaceous palaeomagnetic direction reported from the Kitakami Terrane in NE Japan, indicating that the studied terrane underwent a coherent counter-clockwise rotation as a part of NE Japan after 20 Ma. Conventional K-Ar dating performed on plagioclase grains revealed distinct ages of 14.44 ± 0.95 and 16.52 ± 0.92 Ma for the Takadate Formation (11 sites) and the Ryozen Formation (8 sites), respectively. This type of behavior indicates that two independent episodes of volcanic activities were probably responsible for the production of igneous rocks in Takadate and Ryozen areas. Northerly deflected declination is observed in the samples of the Takadate Formation ($D=355.3^{\circ}$, $I=39.4^{\circ}$, $\alpha_{95}=11.6^{\circ}$), while slightly westward declinations appears in the samples of the Ryozen Formation ($D=333.5^{\circ}$, $I=58.0^{\circ}$, $\alpha_{95}=9.6^{\circ}$). The present geo-chronological and palaeomagnetic results, therefore, suggest that the province of NE Japan was still experiencing a counter-clockwise rotation at 16.5 Ma, however by 14.4 Ma rotational motion has completely ceased. As reported previously, cessation in clockwise rotation of SW Japan occurred at $14.2 \text{ Ma} \pm 0.6$. Thus, any additional evidences regarding the complete cessation of rotational motions in NE Japan can provide a key to understand the timing of opening in Japan Sea.