鳥取県西部地域における断層発達過程
Fault zone development in the West Tottori area, Japan

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Several kinds of investigations were carried out in the NW-SE trending aftershock area of the 2000 Tottori-ken Seibu earthquake (Mj7.3) and along the Nichinanko lineament (L=15km) which runs the SW of the aftershock area. The earthquake occurred in a place where no active fault is identified, with the exception of some short lineaments (e.g. Kanayama lineament: L=2km) in the direction of NW-SE. After the earthquake, many NW-SE to WNW-ESE trending surface ruptures were found in the aftershock area (e.g. Ryokusuien in central part of the area). They indicated sinistral slip sense. On the other hand, brittle fault rock zones are distributed in Late Cretaceous to Paleogene granitic rocks. Miocene rhyolite, basalt-andesite and aplite dikes intrude the granitic rocks, also deformed along the faults. Most fault planes with WNW strike indicate sinistral slip, and most of those with ENE strike show dextral slip. The determined paleo stress field is strike slip type of N-S tension, congruents with the 2000 Tottori-ken Seibu earthquake. However, along a few fault planes with WNW strike the early dextral slip is detected (e.g. Ryokusuien). Brittle fault rock zones are also distributed along the NW-SE trending Nichinanko lineament. Along the lineament, a wider mixture zone is formed. Fault planes with NW strike indicate sinistral slip.

XRD analysis showed that the gouge in the central part of the aftershock area is mainly composed of illite and chlorite (Kobayashi et al., 2006; Manaka et al., 2012), while the gouges in the NW and SE parts of the aftershock area (Kaneki et al., 2019) and those along the Nichinanko lineament (Manaka et al., 2012) are rich in halloysite. Chemical processes are different between these fault rock zones. In the central part of the aftershock area, most gouges were formed at a higher temperature than the neighborhood. On the other hand, the latest gouge is rich in smectite at Ryokusuien.

These facts suggest that the maturity of the fault zone along the aftershock area has been a low level, WNW strike fault planes (R1 shears) and ENE strike fault planes (R2 shears) formed predominantly. Therefore, the early kinematic (dextral) and chemical (illite-chlorite forming hydrothermal alteration) processes are remained. On the other hand, the activity along the Nichinanko lineament has been a higher level in a shallower depth (halloysite-smectite forming environment), NW strike fault planes (Y surfaces) formed predominantly, the remarkable Nichinanko lineament developed. In addition, the Komachi-Ohdani lineament system (L=12km) which runs the NE of the aftershock area also developed. How these fault zones have developed over a long period of time will be discussed.

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