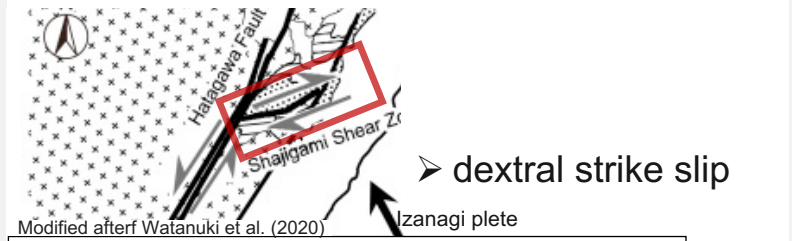
Microstructures and deformation temperature of carbonate mylonites in Shajigami shear zone at eastern margin of Abukuma Mountains, Northeastern Japan

Hiroaki YOKOYAMA[1], Jun MUTO[1], Hiroyuki NAGAHAMA[1] , (1) Department of Earth Science, Tohoku University, Japan

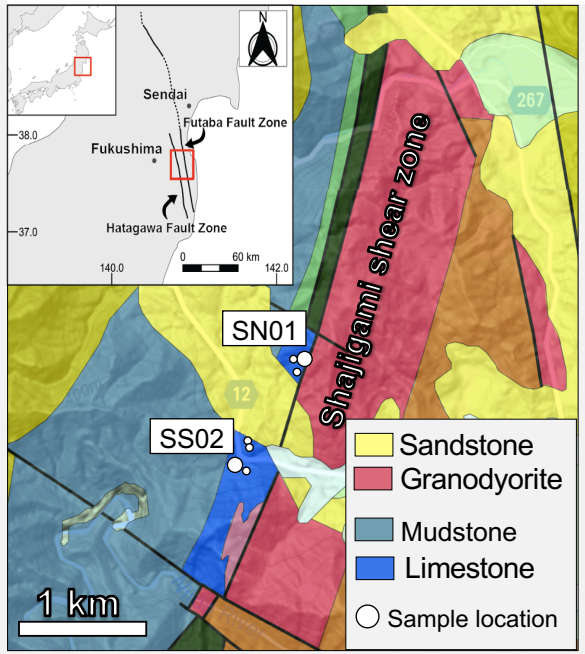
vEGU21 TS2.1 13:48-13:50

Geological setting

◆ Shajigami shear zone

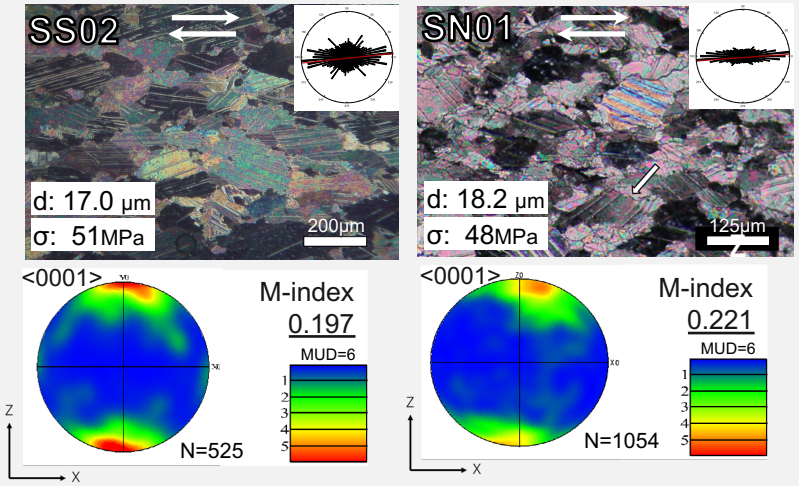


Eurasian continental margin (100–85 Ma)



Result

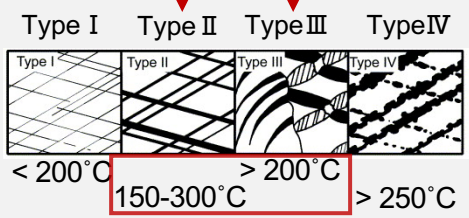
◆ Microstructure



◆ Deformation temperature

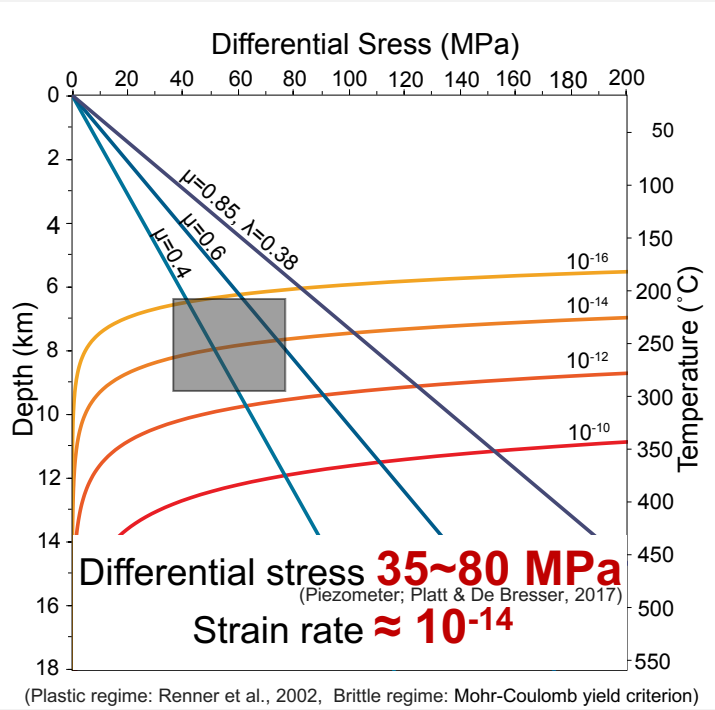
200-300 ˚C

- Illite crystallinity ▶ < 300˚C
- Twin morphorogy (Burkhard, 1993)



Discussion

◆ Deformation mechanism

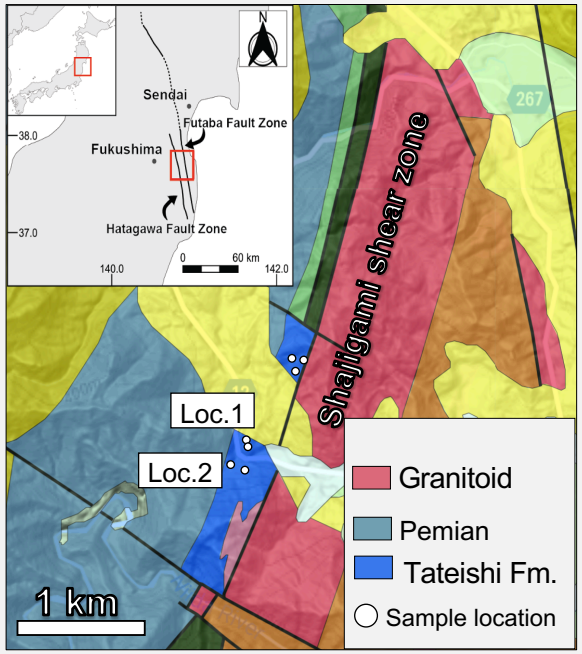


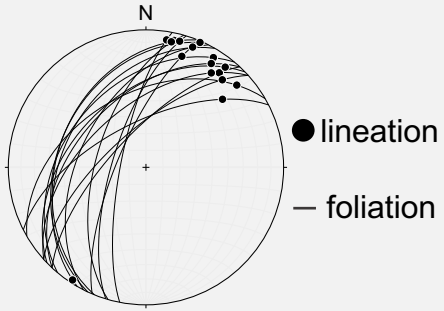
(Plastic regime: Renner et al., 2002, Brittle regime: Mohr-Coulomb yield criterion)

We estimate the **deformation environment** of strike-slip shear zone of the **Eurasian continental margin in Middle Cretaceous.**

Geological settings

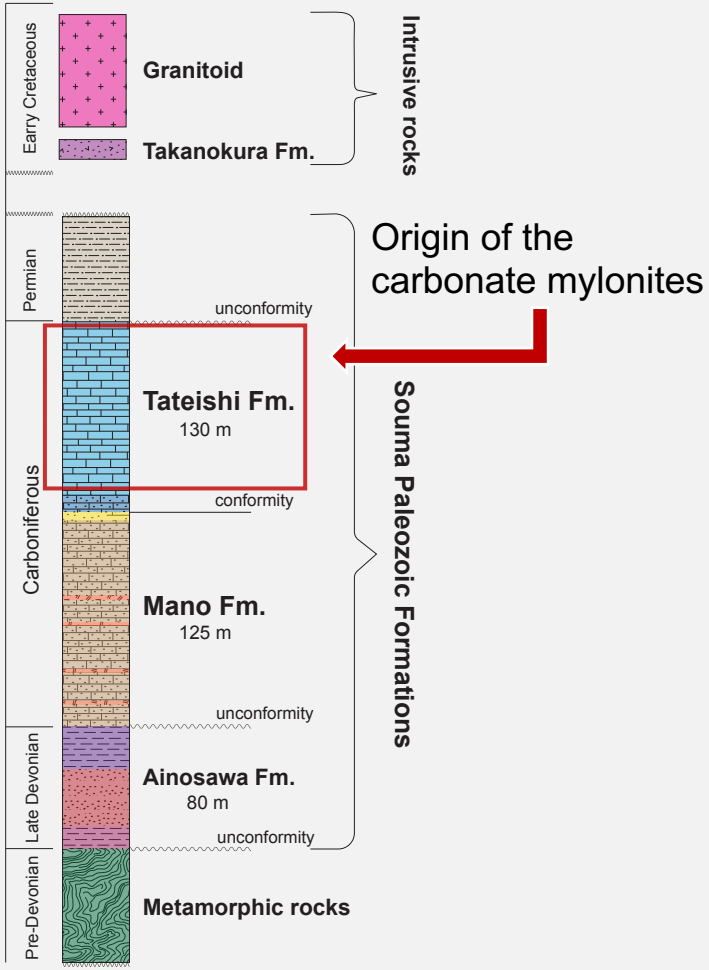
◆ Shajigami shear zone and carbonate mylonites





Lower hemisphere

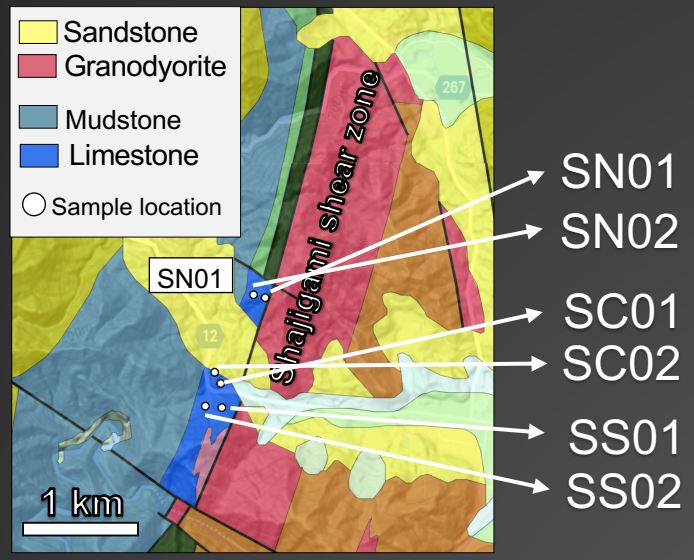
Stratigraphic relationships

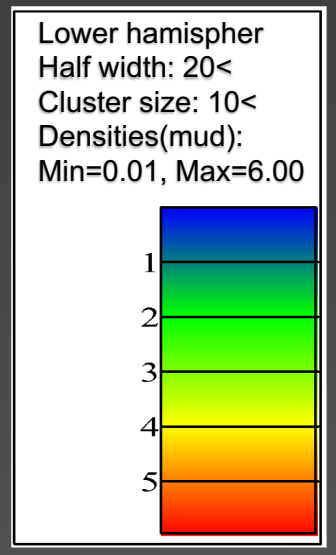


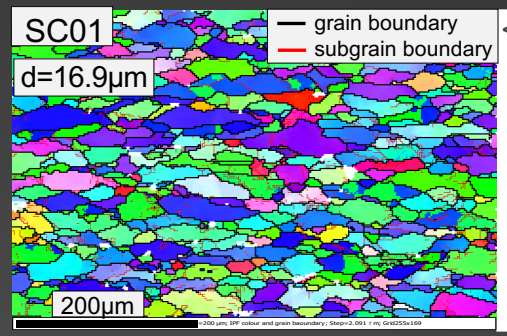


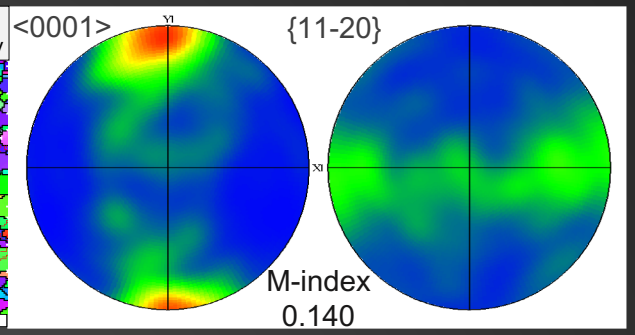


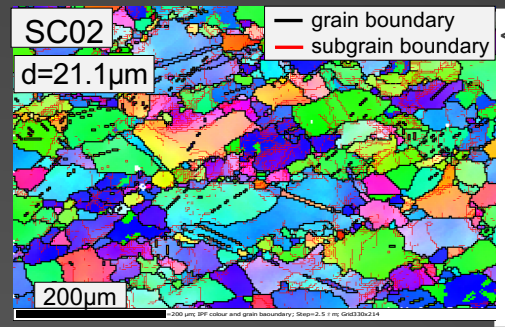
Microstructures

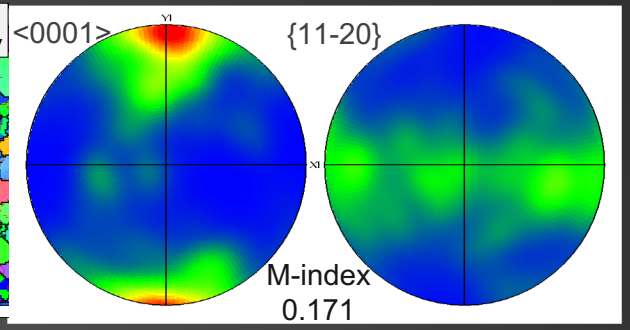


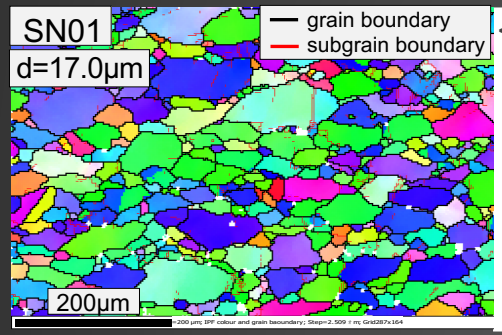


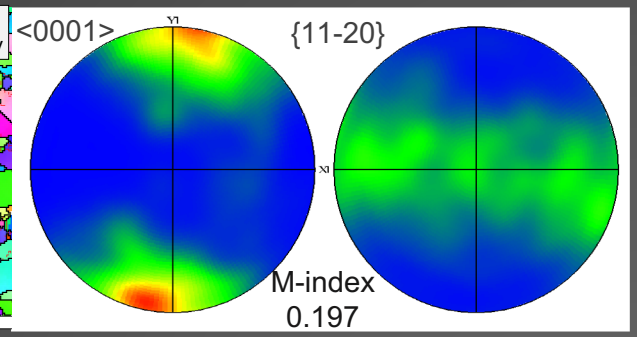


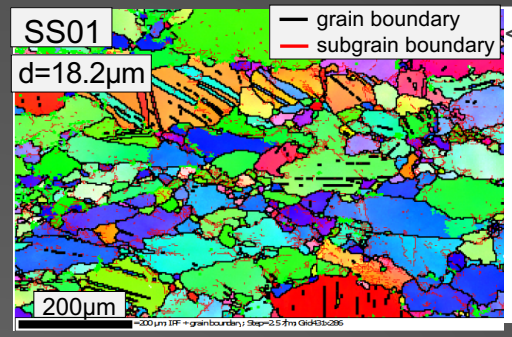


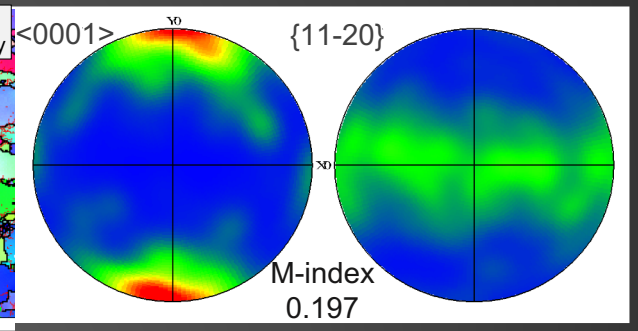


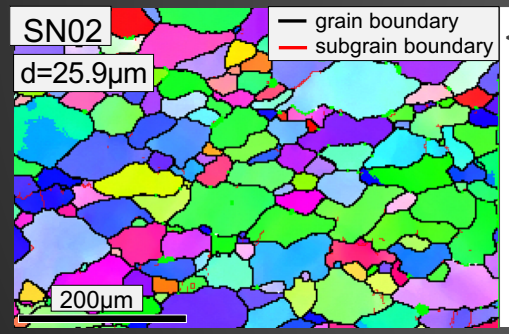


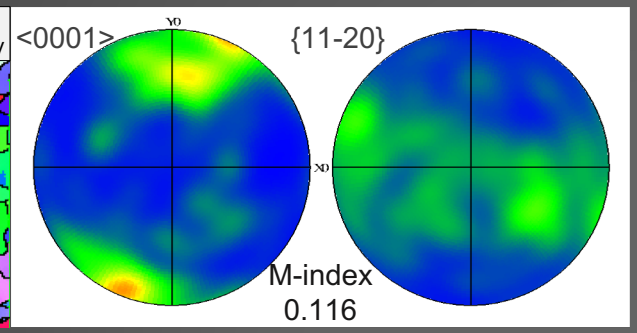


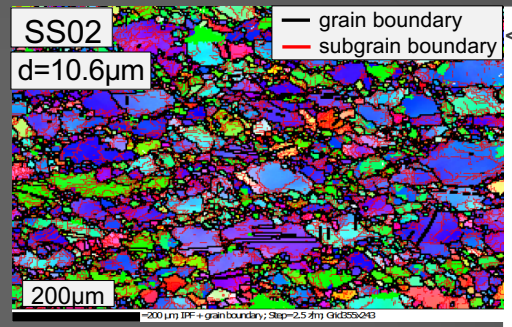


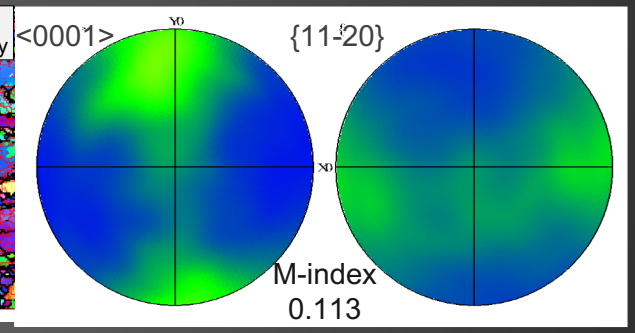






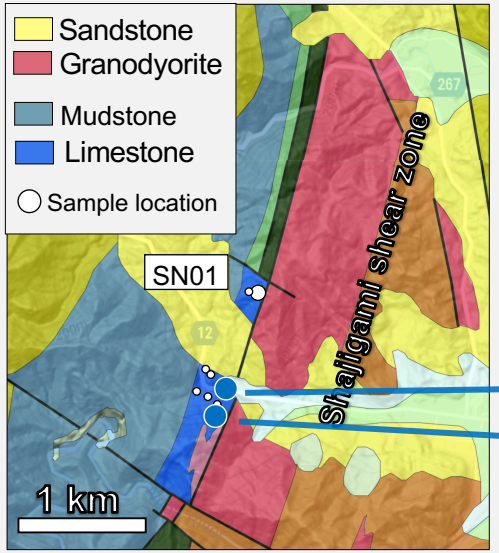






Deformation temperature

1. Illite crystallinity



Metamorphic temperature using illite crystallinity (Mukoyoshi et al., 2007)

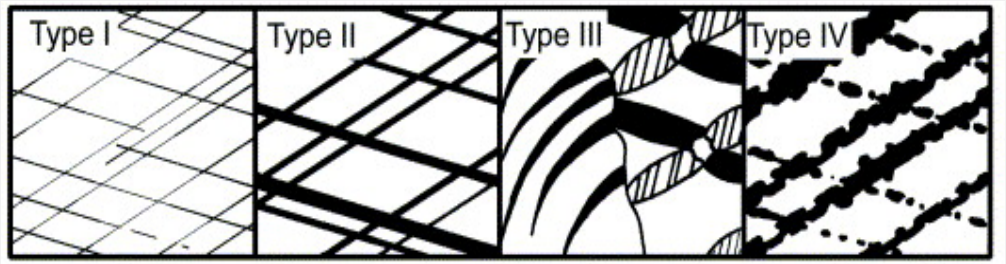
$$T = 353 - 206 \times \mathrm{IC}$$

We used ethylene glycol treated sample calibrated by standard sample as IC value

	Natural sample IC velues (Δ˚2θ)				
	measured		calibrated		
Sample	DRY	EG	DRY	EG	temperature(℃)
18041714	0.254	0.226	0.325	0.272	296.9
20112104	0.290	0.294	0.406	0.394	271.8

➢ The upper limit of deformation temperature ≈ 300˚C

2. Deformation twin morphology

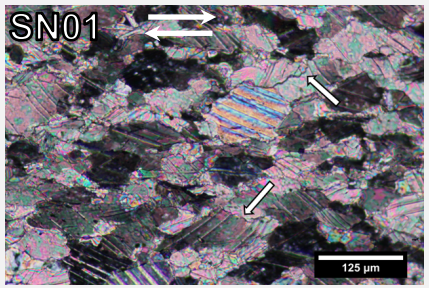


< 200˚C | 150-300˚C | > 200˚C | > 250˚C

Burkhard (1993), Ferril et al. (2004)

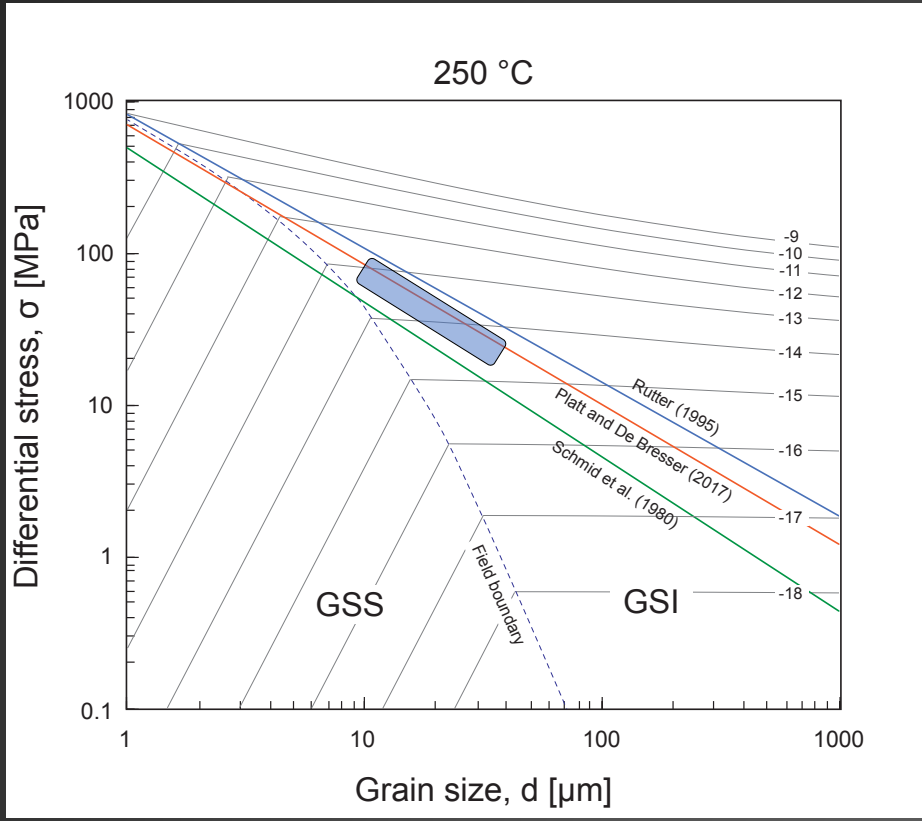
Type Ⅱ and type Ⅲ are widely seen in each sample

➢ The deformation temperature range 200-300˚C



From the above result, we estimated the deformation temperature range 200-300˚C.

Deformation mechanism



Deformation mechanism map using flow lao of Herwegh et al. (2003) in GSS creep and Renner et al. (2002) in GSI creep.

We use the dynamically recrystallized grain size piezometer of Platt and De Bresser (2017).

Assuming a deformation temperature of 250°C, the strain rate is ≈ 10^{-14}.

Concusion

We estimate the **deformation environment** of strike-slip shear zone of the **Eurasian continental margin in Middle Cretaceous.**