Hiatus of a basal unconformity of the middle horizon of the Cretaceous Yezo Group from detrital zircon U-Pb age

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Within the Cretaceous forearc sequence (Yezo Group) of the Sorachi-Yezo Belt, central Hokkaido, the existence of unconformity has been recognized, and a tectonic event shown by the unconformity is called the Intra-Yezo (Naka-Yezo) disturbance (Inoma, 1969). This unconformity was re-confirmed by Kawamura et al. (1999).
In the southern part of Hokkaido, “middle horizon of the Yezo Group (MYG)” unconformably overlies the “lower horizon of the Yezo Group (LYG)” and the “Iwashimizu Complex” (Cretaceous accretionary complex: ICC) (Kawamura et al., 1999;Ueda et al., 2002). Such unconformity in the forearc sequence was considered as the evidence for the appearance of a short-lived forearc ridge in the Yezo forearc basin (Kawamura, 2004). Magnitude, age of formation, and exhumation rate of forearc ridge are essential to the understanding of tectonics of forearc basin. However, the direct determination of the age concerning the unconformity has not been provided in previous studies yet.
To estimate the age of the unconformity and its hiatus, we measured detrital zircon SHRIMP U-Pb ages from three sandstone samples. (1) a sandstone clast (SBR01) in a conglomerate bed in basal part of MYG (Sakubai-gawa River, Mitsuishi district), (2) sandstone (SBR11) alternated with the conglomerate bed, and (3) turbidite sandstone (NER) in LYG (Nae-gawa River, Furano district). Zircon age distribution of SBR01 is very similar to the one of NER. Furthermore, each youngest grain ages are very close (SBR01: 126 ±4 Ma, NER: 125 ±2 Ma, Late Barremian). It is considered that the origin of SBR01 is LYG. Hiatus indicated by the original depositional age of SBR01 and surrounding sandstone (SBR11: 110 ±3 Ma, Late Albian) is 15 my.
Through the hiatus of 15 my, turbiditic sequence of LYG was deposited, buried, lithified, and then uplifted, exhumed and eroded. Duration of burial after deposition until the start of uplift of LYG is still uncertain. But it is supposed to be of several millions of years from the total thickness of LYG (800 –2500 m; Takashima et al., 2001) and general sedimentation rate for forearc basin (200 –300 m / my; e.g. Einsele, 2010). So, we considered that LYG had started to be exhumed after 120 Ma. Therefore, the formation age of unconformity is considered as 120 - 110 Ma. Exhumation of the ICC had begun since about 125 Ma (Ueda et al., 2002). So, turbiditic sedimentation of LYG had even continued after when the exhumation begun. The ‘time lag’ between the timing of uplift of ICC and LYG might indicate the delay in propagation of the effect of exhumation of ICC to LYG, which resulted from tectonic removal of mantle wedge and oceanic crust overlying ICC by detachment faults (Ueda, 2005).

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