



On the Geomorphological Status of the Central Mountain Range, Korean Peninsula

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It has been known that the tectonic uplift forming the central mountain range (Taebaek Mtn.) in the Korean Peninsula has begun since the Tertiary (*Kim, 1961*). Recent studies suggest that most uplift events have occurred during the mid Miocene (*Min et al., 2008*). On the summits of the Taebaek mountain range are low-relief plateaus. They have long been interpreted as paleo erosional surfaces, and thus are considered as transient landscape. In other words, low-relief plateaus have been considered as evidences that the landscape has not responded to the tectonic uplift events yet. However, a recent study on the denudation rates of a plateau reported that the erosion rate of the plateau is much greater than several paleo surfaces reported in other parts of the world (*Byun et al., under revision*). Such high denudation rate raises a question on the previous hypothesis of paleo surfaces.

To test these two contrasting hypotheses, we first identify characteristic features of the plateau landscape using topographic position index (*Weiss, 2001*). Then, we numerically evaluate the required time for the development into the plateau landscape starting from various initial reliefs. Our quantitative analysis shows that dominant features that compose the plateau are flat-convex ridge, straight mid slope, and slightly concave lower slope. Simulation results show that the highly weathered saprolite observed in the plateau accelerates the development into the representative hillslope profiles. As a result, we find that development from different initial reliefs into the representative profiles takes time less than expected by the previous paleo surfaces hypothesis. Such results reconfirm that the plateau is not originated from paleo surfaces, but from recent geomorphic processes aided by highly weathered saprolites. This can also imply that the plateau topography is not in transient state.

References

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