# Summary

The Late Cretaceous sediments of the Gobi Desert are one of the richest fossil assemblages of terrestrial vertebrates of that time in the world, yielding several thousand well-preserved specimens representing hundreds of species (e.g., dinosaurs, lizards, and mammals). Although palaeontological exploration of the Gobi region has been going on for more than a century, there are still some unresolved issues regarding spatiotemporal relationships between particular faunistic assemblages. Due to the continental conditions of sedimentation, there are no marine fossils in the Gobi Basin, that hampers correlation with the global marine biostratigraphic standard. The lack of the volcanic rocks makes radiometric dating impossible. Hence, the precise age of the Gobi sediments remains problematic. Their provisional dating is based on comparisons of the local faunas with those better-dated (e.g., from North America). Moreover, even the relative age of each of the geological units (formations) in the Gobi Basin is unclear. There is no single section where the continuous succession of all the geological formations could be observed. Moreover, the vertebrates of the Gobi Basin do not help in solving the problem being highly endemic.

There are two popular interpretations of the observed faunistic differences. The first one suggests that the sediments of different units have been successively deposited as the environment in the region changed from drier to more humid, recording the succession of vertebrate faunas. Alternatively, it has been suggested that the different geological formations were deposited in roughly the same time, but in a different distance from the river delta adjacent to the dune fields. This would mean that faunas of particular environments co-existed within a complex ecosystem.

In order to understand the nature of differences, I examined the within-species variability of vertebrates that are most abundant in the two major geological units, the Djadokhta and Baruungoyot Formations.

The range of the intraspecific variability of the protoceratopsids seems to be underestimated (**Chapter 4.1**). The four allegedly distinct species coming mostly from the sediments of the same unit are in fact junior subjective synonyms of *Bagaceratops rozhdestvenskyi* Maryańska & Osmólska, 1975. The comparison of variability in samples of protoceratopsid dinosaurs coming from different sites suggests gradual changes in the anatomy between a relatively plesiomorphic *Protoceratops andrewsi* Granger & Gregory, 1923 and a more derived *B. rozhdestvenskyi*. Described material of intermediate morphology

coming from the problematic Üüden Sair site may offer evidence of anagenetic changes within a single lineage, suggesting transitional age of the sediments from that locality.

In **Chapter 4.2** I examined variability of two lizard species, *Shinisauroides intermedium* (Borsuk-Białynicka, 1985) and *Adamisaurus magnidentatus* Sulimski, 1972. The results suggest that samples coming from geographically distant sites such as Bayan Mandahu from the Inner Mongolia, and Hermiin Tsav and Khulsan from the Nemegt Basin, are not significantly different. However, the samples from the problematic Ukhaa Tolgod site, located in the Nemegt Basin, is significantly different from the others. It is plausible that this distinction between samples from adjacent sites is due to different geological age rather than geographical or environmental isolation.

Description of a new dromaeosaurid individual from the Baruungoyot Formation shows that it represents the velociraptorine *Shri devi* Turner et al., 2021 (**Chapter 4.3**). The cranial anatomy, so far not recognized in this species, suggests its very close affinity with *Velociraptor mongoliensis* Osborn, 1924, known solely from the Djadokhta Formation. Relationship between the more plesiomorphic in anatomy *V. mongoliensis* and exhibiting more derived features *Shri devi* is congruent with the pattern of changes observed in the Protoceratopsidae. This suggests the possible anagenetic relationships between these closely related velociraptorine species.

The revision of the vertebrate distribution from each of the site is presented in **Chapter 4.4**. Although faunas within geological units are highly endemic, the pattern of distribution of protoceratopsid and dromaeosaurid dinosaurs suggests that is not caused solely by the environmental or geographic differences. The frequency of lizard species in samples from particular sites may be an important indicator of the subtle environmental differences between them.

The presented data suggest that the spatial distribution of samples is not sufficient to explain the observed differences. Some vertebrate faunas from particular formations and sites are most likely of different geological age.