**Table S1.** Summary of stratigraphic, thickness, lithological, and facies data (after Cook *et al.* 2002) of the sections sampled during the present study.

|  |  |  |  |
| --- | --- | --- | --- |
| **Section** | **Stratigraphy** | **Thickness** | **Intervals sampled during the present study** |
| **Stratigraphy** | **Thickness** | **Dominant lithology** | **Depositional environment** |
| **Aktobe** | Famennian to Serpukhovian | ~1600 m | a) Famennianb) Tournaisianc) Viseand) Serpukhovian | 400 m | a) microbial laminites b) lime mudstones, carbonate turbidites, carbonate debris-flowsc) lime mudstones, carbonate turbidites, carbonate debris-flowsd) lime mudstones, mud mounds | a) tidal flat / peritidal faciesb) slope faciesc) slope faciesd) deep ramp facies |
| **Besharik** | Frasnian to Tournaisian | ~1300 m | Famennian | 40 m | lime mudstones | deep ramp facies |
| **Ushozen** | Visean to Bashkirian | ~700 m | a) Viseanb) Serpukhovianc) Bashkirian | 300 m | a) lime mudstones/wackestones, bioclastic grainstones/packstonesb) algal laminites c) laminated lime mudstones/wackestones | a) deep ramp facies / open shelf faciesb) tidal flat /peritidal faciesc) deep ramp facies / open shelf |
| **Zhankurgan** | Frasnian to Bashkirian | ~3800 m | Visean | 150 m | lime mudstones, carbonate turbidites, carbonate debris-flows | slope facies |
| **Zhertansai** | Famennian to Visean | ~2700 m | a) Famennianb) Tournaisian | 80 m | a) bioclastic wackestonesb) lime mudstones/wackestones | a) deep ramp facies b) deep ramp facies |