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Environmental change in the Permian of Spitsbergen: From a (warm-water) peritidal, carbonate platform (Gipshuken Formation) to a (temperate) storm-dominated, mixed siliciclastic-carbonate ramp (Kapp Starostin Formation)

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Three investigated sections within NE Svalbard (NE-Spitsbergen, SW-Nordaustlandet) comprising the uppermost strata of the Gipsdalen Group (Templet and Sørfonna members, Gipshuken Formation) and the lowermost strata of the overlying Tempelfjorden Group (Vøringen Member, Kapp Starostin Formation) reveal two fundamentally different depositional settings.

Sediments of the lower Templet and Sørfonna members (Sakmarian-early Artinskian?) mainly consist of laminated limestones, dolomitic breccias and intercalated, thin claystone horizons. The strata reveal a marginal marine setting characterized by supratidal sabkha and peritidal platform areas. Commonly occurring, low-diverse microbial limestones (cyanobacteria mats), mudstones and more rarely bioclastic, peloidal wacke- to packstones reflect restricted, low-energy tidal flats under semi-arid climatic conditions. On supratidal sabkhas, the marine strata were affected in varying degrees by desiccation, erosion, meteoric alteration, reworking and pedogenesis, reflected by the occurrence of *Microcodium*, lithoclastic rudstones, intense staining and dolomitization of the limestones.
The strata of the overlying Vøringen Member (late Artinskian?-Kungurian) start with coarse-grained, mixed-bioclastic, sandy and partly silicified limestones, enclosing locally occurring in-situ bryozoan bioherms at the base. These are overlain by alternating strongly silicified, brachiopodal limestones and intensely bioturbated, fine-grained, sandy allochem limestones to allochemic sandstones, forming prominent sediment couplets. In the upper part, the sediments grade into a thick succession of skeletal sandstones to pure sandstones with occasional interbedded brachiopod shell horizons.
The entire succession reflects subtidal, inner and mid-ramp areas of a temperate, open-marine, mixed siliciclastic-carbonate ramp. Nearshore areas of the inner ramp were characterized by reef flats of bryozoan bioherms, while the sediment couplets of alternating brachiopodal limestones and bioturbated, fine-grained, sandy allochem limestones represent repetitive storm events (proximal tempestites).
The contrasting lithologic successions of the Gipshuken and Kapp Starostin Formations are separated by a major disconformity, characterized by condensed horizons and intensively burrowed hardgrounds representing a hiatus of unknown duration (between 1- max. 15 Ma).

The changes in the depositional setting and the associated shift of biota to entirely heterozoan assemblages may indicate either decreasing water temperatures and/or an elevated nutrient level.
Sediments of the Kapp Starostin Formation also mark the onset of massive chert deposition ("Permian Chert Event") on Svalbard, formed in cool, nutrient-rich waters all along the western and northern shelfs of Pangea. Whether this episode is triggered by changes in oceanographic circulation patterns, the northward drift of Pangea, or is due to the closure of the Uralian gateway to the Tethys is controversially discussed.