Influence of global and regional environmental changes on Mississippian/Pennsylvanian coral assemblages of the Liard Basin, NW Canada

The aim of this project is to examine the settlement, development and decline of corals as a response to variable environmental conditions in the Liard Basin, NW Canada, during Mississippian/early Pennsylvanian times. The study will be conducted against the background of the world-wide expansion of corals in the Viséan and their deterioration at the end of Serpukhovian. The particular objectives include a study of taphonomy, taxonomy, stratigraphy, environmental conditions, and the reconstruction of palaeobiogeography. An evaluation of environmental conditions will include the determination of the depositional environments of the main lithofacies, water depth, sea-surface temperature, carbonate productivity, and the delivery and sources of siliciclastic material. The shallow- and deep-burial diagenetic histories of the succession will also be determined.

The subject of the study will be the Tournaisian/ Viséan Flett Formation, the Viséan Golata Formation, and the Viséan – Serpukhovian/Bashkirian? Mattson Formation. The project includes the elaboration of the taxonomy of corals, conodonts and pollens. Microfacies analysis of limestones of the Flett and Mattson formations will contribute to palaeoecological and palaeogeographical conclusions. Additionally, a quantitative analysis of clast composition in sandstones, heavy mineral analysis, and detrital zircon SHRIMP datings will be conducted in order to decipher the sources of siliciclastic material which buried the carbonate shelf in the late Viséan. Seawater isotope geochemistry ($\delta^{13}C$ and $\delta^{18}O$) will be recorded from brachiopod shells. Glauconite and phosphates occurring in the upper Flett Formation will be studied in greater detail as traces of slowing down the deposition.

The research will result in: (a) the reevaluation of regional stratigraphy, particularly the revision of the upper limit of the Carboniferous in the Liard Basin; (b) the revision of some North American Carboniferous coral genera and the documentation of their difference from the western and central European corals of similar morphology; (c) establishing the time of the isolation of western Laurussian marine faunas from those of south-eastern Laurussian shelves, and the time of the appearance of the SE Laurussian marine species in the western Laurussian seas; (d) the examination of the Serpukhovian coral extinction from a Canadian perspective; (e) establishing the provenance of siliciclastic material, which could provide important information about uplift and tectonism in adjacent areas.