3D MODELLING OF THE QUATERNARY STRATIGRAPHIC SEQUENCE OF THE SOUTHEASTERN APPALACHIANS OF CANADA

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Complex sequences of glacial deposits, sub-glacial, ice marginal and frontal deposits as well as interglacial and interstadial lacustrine, fluvial and organic-rich sediments, have been mapped and documented in the southeastern Appalachians of Quebec (Canada), north of the international border. Reconstructing Late Pleistocene paleoenvironments represents an important challenge, mostly because the geomorphology associated with those sequences have been eroded during subsequent ice advances of the Laurentide ice sheet. This study proposes the development of a methodology for three-dimensional numeric geomodelization of surficial deposits for two major river drainage basins, totalling more than 20 000 km$^2$. This model is based on the integration of surficial sediments maps and boreholes logs with the use of GIS and 3D geomodeling system. This geomodeling study represents a novel approach for defining the physical lateral extension of Quaternary sediments. Stratigraphic information for the model comes from 30 000 outcrops and 40 000 boreholes archived in the Quebec provincial database (Hydrogeologic Information System: SIH), Canada federal database (GSC) and from private firms. This large data set was completed with detailed geologic section analyses. Over 30 Quaternary geology maps have been validated and completed at a scale of 1: 50 000. The specific methodology for our three-dimensional numeric geomodelization of surficial deposits will be outlined. The main output of this geomodeling work is refinement of the lateral extension of the Quaternary lithosomes, defined as litho- and hydrostratigraphic units, as constrained by required strict coherence between surface distributions deduced from geologic maps and borehole stratigraphy data.