

OTISH BASIN: DISCOVERY OF NEARLY 2,1GA SHOCKED ROCKS POTENTIALLY OWNING TO A D>500 KMS IMPACT STRUCTURE, QUÉBEC, CANADA.

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The Otish Basin (OB) is located in northern Québec, Canada, and is only accessible by air transportation. The palaeoproterozoic sediments of the OB are known as the Otish Group (OG). They are mostly detrital in composition with minor carbonated material and lay unconformably on the archaean basement of the Superior Province, being limited to the south by the Grenville Province. The sedimentary pile of the OG has been studied by the first author in the 80's while performing a basin analysis of the entire OB [1]. Roughly, the OB covers an area of about 5200 km² and its thickness averages an estimated 2,4 km. Four fining upward megacycles have been characterized, two of which, the older ones from the Indicator Formation, express reducing sedimentary environments. The two younger megacycles of the Peribonca Formation are well characterized by the oxidizing conditions of sedimentation. The evolution of the OB has been disturbed by an event which has been responsible for a widespread gabbro emplacement. Thought to be intrusive up to the 80's, more recent works showed that the gabbro has been emplaced in an extrusive manner according to their distribution and their physical relationship with the sediments. Shocked derived material (glass and PDFs) are observed in the sediments under the gabbro sheet and inside the large enclaves found in the gabbro itself. That discovery led to a preliminary re-examination of the thin sections already studied for the basin analysis in the 80's. By paying attention to the shock metamorphism effects, preliminary results allow us to postulate that the overall OB has been subjected to a major impact shockwave between the Indicator and the Peribonca times. Some poorly defined PDFs have been observed up to 1,06 km in depth from drill hole samples located in the center of the basin. The oxidized sediments of the Peribonca Formation are now thought to be intimately associated with the impact event, being coeval to the gabbro emplacement. According to the scale of the event we are facing, our working hypothesis is as followed: 1) the OB has been subjected to the shockwave stress associated with a major impact event some 2,1 Ga ago for which the postulated radius of the relevant structure is well over 250 km; 2) since the Mistassini Basin (MB) shows sedimentary and structural similarities with the OB and because of the geomorphic characteristics of the MB showing analogy with the multi-ring impact structures, we consider MB as an element of our puzzling huge structure; and 3) the gabbro suite is interpreted as a melt sheet which is potentially linked to a large igneous province observed in the Grenville Province to the south, i.e. a gabbro-related anorthosite suite. For future reference, we propose to temporarily call this hypothetical structure the Mistassini-Otish Impact Structure.

References: [1] Genest S. 1989. *PhD thesis, Université de Montréal, Canada.*