

Mistassini-Otish Impact Structure II: Melt-bearing impact breccias observed at the very base of the Mistassini Group.

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Three units are recognized in the Mistassini basin (MB), from base to top, the lower member of the Albnel formation (AF), the AF upper member, and the Témiscamie iron formation. The AF lower member has been subdivided into six subunits (A to F) totalling nearly 900 m in thickness. The subunits A and B are known for their copper potential. They are respectively described as a basal clast-bearing dolomitic sandstone unit, now defined as the Mistassini spherule layer (MSL), and a dolomite unit hosting black shale horizons. According to former workers, the basal subunit A is assumed to lie on a dolomite-cemented regolith composed of polymict breccia and conglomerate mixed with sandy dolomite and stromatolitic dolomite. The AF upper member and the subunits C to F of the lower member, are composed of massive dolomite totalling more than 600 m in thickness. The average aggregated thickness of the detrital components of both subunits A and B represents 3.1% of the AF total thickness, i.e. 46.9 m / 1500 m according to DDH data.

A total of 476 DDH logs have been assessed, of which 341 encountered the MSL and 76 intersected the entire subunit A. According to the DDH log descriptions, the main components of the subunit A can be summarized as followed: stromatolitic breccias, stromatolitic dolomite fragments, sandy dolomite breccias (MSL fragments), polymict regolith-like breccias, shattered granite fragments ranging up to 15.9 m across, dolomite-cemented breccias and conglomerates, pisolite-like and other coarse rounded fragments, graphitic and carbonaceous materials, nodular structures and fragments showing concentric rings of cherty and carbonated materials. Quenched textures around the fragments are a common feature and finely crystallized dolomite cement is ubiquitous within the intensely fractured basement underlying the AF.

Shock features such as PDFs, PFs and maskelinite have been found in quartz monzonite fragments observed in the melt-bearing polymict impact breccia which encloses MSL remnants. On cut slab from these fragments, the fully altered feldspars appear as black grains. Decorated PDFs have been observed in a quartz grain. PDFs are quite common in the microclines and orthoclases observed in the thin section. Two sets of PDFs have been observed in the most pristine sections of an unaltered rutile.