
**LAM-ICP-MS geochronological studies from the
Botwood Basin and Buchans areas, Newfoundland**

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Laser Ablation Microprobe Inductively Coupled Mass Spectrometry (LAM-ICP-MS) has proven increasingly successful for the determination of ages from both detrital and magmatic zircons. We have used the LAM-ICP-MS facility at Memorial University to date detrital zircon grains from Silurian-Ordovician sedimentary rocks in central Newfoundland, and detrital and magmatic zircons from the Buchans Group, west-central Newfoundland.

The Silurian-Ordovician sequences include: a) one sample each from the Badger (BAG) and Davidsville (DG) groups; these units represent roughly synchronous deep marine Ordovician sequences, b) two samples, one from the top and one from the bottom, of the Silurian Botwood Group (BOG), a sequence of continental red-bed sandstones, and c) one sample from the Silurian Indian Islands Group (IIG) which comprises shallow marine limestones and calcareous sandstones. The BOG and IIG samples represent material from opposed sides of the Dog Bay Line, a regional transpressive structure thought to represent the terminal suture of the Iapetus Ocean. The detrital zircon populations in all units define predominantly Paleozoic ages for all samples but with distinctly different older populations; the Paleozoic ages represent material from the island arc and other volcanism in the Iapetus Ocean. In detail, the BOG and BAG samples have a range of older ages which may represent material from the Grenville and Makkovik provinces (Laurentian margin), whereas the DG sample contained a range of older zircons which may represent Avalonian material from the Gondwanan margin. The IIG sample has older populations which may represent material from both the Laurentian and Gondwanan margins and which, therefore, suggest that

this unit represents terminal sedimentation within the Iapetus Ocean.

Single samples with magmatic zircons were analysed from the Ski Hill Formation (SHF), Feeder Granodiorite and Prominent Quartz Rhyolite (PQR) of the Buchans Group. Two samples of detrital zircons were collected from the Sandy Lake Formation. The SHF rhyolite provided very small zircons which gave poorly defined ages of ~500 Ma and ~950 Ma (Grenvillian); a previously defined TIMS U-Pb zircon date for the Buchans River Formation, the overlying unit to the SHF, is $473 \pm 3/-2$ Ma. Zircons from the Feeder Granodiorite defined an age of 503 ± 8 Ma and the Prominent Quartz Rhyolite zircons clustered around 494 ± 4 Ma; one zircon contained a probable Grenvillian core. Zircons in one Sandy Lake Formation (SLF) sample defined a tight cluster of ages around 484 ± 4 Ma, and in the other sample clustered at 488 ± 6 Ma and also had a single grain with a probable Grenvillian core. The older ages for the SLF, which is the stratigraphically highest unit in the Buchans Group, would appear to be counterintuitive, however, the data actually support earlier work by others which suggested that the detritus in SLF was derived mainly from the PQR and that the PQR formed topographic highlands to the Buchans Group. Lack of other populations in the SLF samples also suggests deposition in a restricted, caldera-like basin.