



# Research Links

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## CAVES OF THE ROCKY MOUNTAINS

*Features of the landscape for half a billion years, caves give us a glimpse into times past*

Jonathan Rollins

### THE CAVES

A recent inventory for Alberta and the Southern Canadian Rocky Mountains (south of the northern border of Jasper National Park) documents 137 caves in the jurisdiction of Parks Canada and several provincial departments (*Table 1*).

Defining what a cave is can be highly subjective. The inventory, with a few exceptions, used the cave explorers definition: a cave has some extent of bedrock passage, and its passages are formed by dissolution processes rather than frost shattering or bedrock collapse (thus obviating the all-too-common Rocky Mountains "frost-pocket").

Since caves are typically found in limestone or dolomite, it is hardly surprising the Canadian Rocky Mountains contain caves. What is surprising, considering the large areas of carbonate rocks involved, is that more caves have not been found. The majority of caves and karst areas have entrances at about 2000 metres above sea level, and have been extensively modified by sequential periods of glaciation. Cave passages can be seen heading out of mountain sides, and occasionally have been de-roofed. The entrances of many extensive cave systems consist of small openings in scree or moraine material, often enlarged by digging in order to gain access. Glaciation has undoubtedly removed and truncated many cave systems.

The caves, when compared with caves in other parts of the world, are not notable for their length, averaging half a kilometre within the inventoried area. Most Rocky Mountains caves have a strong vertical component with sections of passage known as "drops" or "shafts," which can only be descended and ascended using rope climbing systems. Low temperatures (typically 2–3°C) and long approaches make cave exploration in the Canadian Rocky Mountains an extremely arduous activity.

The inventory area includes Canada's longest and deepest caves. Castleguard Cave, located beneath the Columbia Icefield, now consists of over 20 kilometres of explored passages. In Robson Provincial Park, Arctomys Cave, with a surveyed depth of 536 metres, is the deepest cave North of Mexico. Many other remarkable caves lie within the inventory confines, notably Yorkshire Pot at Crowsnest Pass, which, following connections with five other caves, now has a surveyed length of more than 12 kilometres.

Rocky Mountain caves sometimes occur in isolation, but more often are grouped together in karst areas. The four mountain parks



*(Photo credit: Marek Voháček)*

*Castleguard Cave: one of Canada's longest and deepest caves*

contain some of the finest examples of alpine karst in the world. These areas of solutionally eroded limestone are easily recognized by surface features, including sinking streams, springs, limestone pavements, closed depressions, and shafts (steeply descending cave entrances). Micro-karst features, known collectively as karren, consist of distinctive grooves and fissures in exposed bedrock surfaces. Fine examples of surface karst together with underlying cave systems can be found in Castleguard Meadows (Banff National Park), Hawk Creek (Kootenay National Park), and the Snaring karst (Jasper National Park). The Burstall Pass area in Kananaskis Country has extensive surface karst, but no significant known caves.

### GEOLOGY AND CAVE FORMATION

All caves in the Canadian Rockies are contained in carbonate rocks, *i.e.* limestone and dolomite of the Paleozoic Era (540–258 million years ago). The Livingstone and Palliser carbonates contain the Snaring, Crowsnest, and front range caves. The Cathedral

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