

Alberta Rocky Mountains and Foothills; Geological Compilation Map, scale 1: 500 000

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Geological compilation map; challenges and solutions

Due to its high economic potential, the Alberta Foothills have been the focus of intense geological exploration and research. The need for an adequate geological base for informed industrial, environmental and regulatory decisions always existed. Mandated by the Alberta government with providing updated geological knowledge in a readily available digital format, the Alberta Geological Survey (AGS) has produced the first stand-alone, updated and seamless bedrock geological compilation map of the Alberta portion of the Rocky Mountains and Foothills at a scale of 1:500 000. This map displays the entire region at sufficient detail for the end-user and in a manageable size when printed.

The Alberta Rockies and Foothills are part of the continental-scale Foreland Fold and Thrust Belt, which forms the eastern margin of the North American Cordillera. The AGS compilation map of the geology of the Rocky Mountains and Foothills encompasses the Alberta portion of the Foreland belt, from the Alberta/British Columbia border to the international border. This segment of the orogen has been mapped by different generations of geologists over a period of one century and the published maps vary in scale from 1:50,000 and 1: 63,360 to 1: 250, 000 and 1:1,000,000. Therefore, the geological information included on existing geological maps for different areas varies widely.

The AGS compilation map incorporates a consistent level of detail for the Alberta portion of the Foreland Belt achieved by: 1) systematic literature review and acquisition of all relevant geological information source materials; 2) digitizing and georeferencing of all existing hardcopy GSC and AGS geological maps, as well as selected compilation maps and maps from field guidebooks published by the Canadian Society of Petroleum Geologists and universities; and 3) extensive field work. Tens of thousands of polygons (stratigraphic unit outlines) and thousands of lines (synclines, anticlines and faults) were merged and attributed (as polygon, line and point layers), the geological information was filtered, reorganized and structured into a new GIS product with a comprehensive database. AGS has conducted extensive field work in order to check accuracy of contacts on old maps, to resolve map edge discrepancies and various inconsistencies across boundaries between local maps with uneven geological information or inconsistent nomenclature, structural and stratigraphic interpretations. In an effort to better constrain the tectonostratigraphic evolution of the Alberta portion of the Cordilleran Orogen a series of paleontological and isotope samples were collected from selected stratigraphic units and major thrust faults. A new, regionally consistent stratigraphic scheme, appropriate for the scale of the map is aided by new colour and labelling schemes.

The geological map of the Alberta Rocky Mountains and Foothills can be readily updated and republished with the addition of new layers (coal mines, mineral occurrences, potential field, etc.) as the need arises. The map is available for downloading from the AGS website together with the shape files and as a user friendly GIS web application.

References

Over 100 titles in the reference list on map.