



Climate change impacts on continental weathering through the Middle Jurassic to Lower Cretaceous of Sverdrup Basin, Canadian Arctic

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Jurassic to Cretaceous strata of Sverdrup Basin, Canadian Arctic Archipelago, contain marine and non-marine successions that can be studied to reconstruct ancient paleoclimates and paleoenvironments that are poorly understood in high-latitude regions. We use element geochemistry integrated with palynology to study a continuous Aalenian to Albian-aged succession preserved in the Hoodoo Dome H-37 oil and gas well located on southern Ellef Ringnes Island near the centre of Sverdrup Basin. Cluster analysis (stratigraphically constrained incremental sum of squares; CONISS) is used to delineate four geochemical zones that are broadly coeval with major changes in palyno-assemblages interpreted to reflect changes in regional paleoclimate. Zone 1 (late Aalenian to Bathonian) is characterized by palynomorphs associated with humid and warm climate conditions. The chemical alteration index (CAI) is high in this interval, expected under this a humid and warm climate. A transition to a seasonally arid and warm climate occurred in the Bathonian and persisted until the Kimmeridgian or Valanginian (Zone 2). This interval is characterized by decreased chemical weathering, indicated by a drop in CAI. The onset of Zone 3 (Kimmeridgian or Valanginian to late Barremian or early Aptian) occurs during a transition to humid and cool climate conditions and is associated with a period of regional uplift and rifting. Zone 3 is marked by a substantial and progressive drop in CAI, indicating a transition from a weathering to transport-dominated system, possibly associated with landscape destabilization. Reduced tectonic activity in Zone 4 (early Aptian to early or mid Albian) shows a return to active chemical weathering, possibly associated with landscape stabilization, suggested by a continued increase in pollen from upland coniferous taxa. The geochemical and palynological records of Middle Jurassic to Lower Cretaceous strata of the Hoodoo Dome H-37 oil and gas well show close correlation, indicating long-term linkages of terrestrial plant communities and weathering processes.