

The chemostratigraphic typing of the Nanushuk and Tuluvak Formations (Cretaceous), Colville Basin, Northern Alaska.

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A chemostratigraphic study, supported by heavy mineral analysis, has been carried out on the Nanushuk Formation (Albian-Cenomanian), the Tuluvak Formation (Turonian-Coniacian) and the intervening shaly unit, assumed to be the Seabee Formation (Turonian), as penetrated by two wells. Both wells are located on the central North Slope of Alaska. These Cretaceous sequences form part of the eastward prograding clinoform play in the Colville Basin, Northern Alaska.

Chemostratigraphic analysis was carried out on approximately 4500' (c.1400m) of section and a total of 194 cuttings samples. Although sandstone and claystone units are present in the study intervals, the volumetrically most abundant lithology is silt to fine sandstone. Therefore, approximately 150-200 chips of silt and/or fine sandstone were hand-picked from each cuttings sample and then analysed using inductively coupled plasma - optical emission spectrometry (ICP-OES) and inductively coupled plasma - mass spectrometry (ICP-MS). By combining these two analytical methods, a total of 50 elements are determined.

This study shows that the inorganic geochemical signature of the Nanushuk Formation is different to that of the Tuluvak Formation, despite lithological similarities. Heavy mineral analysis demonstrates that one of the main controls on this change in geochemistry is a marked change in the type of mica present. Chemostratigraphic analysis also allows each of these formations to be further subdivided into potentially correlative stratigraphic units. The geological factors controlling the geochemical variations within each formation is shown to be a complex mixture of changing provenance, changing clay mineral species and periodic volcanogenic influences.