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TITLE: CONTRASTING CRETACEOUS LITHOFACIES IN THE ARCTIC NATIONAL WILDLIFE
REFUGE, NORTHEASTERN ALASKA.

ABSTRACT

Two coeval but contrasting stratigraphic sequences occur in the Arctic National Wildlife Refuge (ANWR). We will refer to these sequences as the Ignek Valley sequence and the Arctic Creek-Bathtub Ridge sequence.

The Ignek Valley sequence consists of Kingak Shale (Jurassic to Valanginian), Kemik Sandstone (Hauterivian), Pebble Shale (Hauterivian-Barremian), Hue Shale (Aptian? to Santonian), and turbidites of the Canning Formation (Campanian to Paleocene). It is best exposed in Ignek Valley, between the Sadlerochit and Shublik mountains, and north of the Sadlerochit Mountains.

The Arctic Creek-Bathtub Ridge sequence consists of black shale with local siltstone beds (Jurassic to Lower Cretaceous), manganiferous shale (Lower Cretaceous), interbedded shale and siltstone turbidites (Albian), and sandstone turbidites of the Bathtub Graywacke (Albian?) and Arctic Creek facies (Albian). Bentonite occurs locally but its volume and stratigraphic significance could not be determined due to the poor exposures. The Arctic Creek-Bathtub Ridge sequence is poorly exposed in low relief hills near Arctic Creek, south of the east end of the Sadlerochit Mountains. Here, beds are generally south-dipping and the sequence has been structurally repeated. This sequence is well exposed at Bathtub Ridge approximately 90 km southeast of Arctic Creek.

The three main differences which distinguish the Arctic Creek-Bathtub Ridge sequence from the Ignek Valley sequence are: 1) the lack of the regionally persistent Kemik Sandstone in the Arctic Creek-Bathtub Ridge sequence (although quartzose siltstone turbidites do occur at Bathtub Ridge at about the same chronostratigraphic level as the Kemik Sandstone), 2) the lack of manganiferous shale in the Ignek Valley sequence, and 3) the lack of Albian turbidites in the Ignek Valley sequence.

Our work suggests that the Arctic Creek and Bathtub Ridge strata were once part of a continuous depositional basin, and that the Arctic Creek strata have been thrust northward along a detachment surface in the Kingak Shale into juxtaposition with the Ignek Valley sequence. The contrasting lithofacies of the Arctic Creek-Bathtub Ridge sequence and the Ignek Valley sequence suggest that deposition took place in two separate basins or in distinct non-overlapping portions of the same basin.

In addition, it is likely that this thrust fault has displaced the Ignek Valley sequence northward into the Marsh Creek area on the north side of the eastern Sadlerochit Mountains. Thrust telescoping can account for the apparent absence of the Ignek Valley sequence along much of the Sadlerochit River valley south of the eastern Sadlerochit Mountains and for the juxtaposition of contrasting lithofacies of the Kemik in the Marsh Creek area.

We also believe that the Paleocene fluvial and deltaic Sabbath Creek deposits east of the Sadlerochit Mountains are probably part of the Arctic Creek-Bathtub Ridge sequence. Coeval deposits of the Ignek Valley sequence consist of Campanian to Paleocene turbidites of the Canning Formation. Paleocurrents from the Canning Formation suggest that the depositional basin deepened to the east and northeast in the direction of the non-marine and shallow marine deposits of Sabbath Creek. We speculate that the Sabbath Creek strata were thrust northward along with the Arctic Creek facies, probably during Eocene time.