

## CHAPTER 6

## DISCOVERY OF OIL-STAINED SANDSTONE WITHIN THE CHINITNA FORMATION, NORTHERN INISKIN PENINSULA

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The potential for Middle and Upper Jurassic sandstone to serve as viable conventional reservoirs in Cook Inlet is poorly known (LePain and others, 2013). The purpose of this report is to announce a newly discovered occurrence of non-fractured, oil-stained Jurassic rocks exposed along the northern shore of the Iniskin Peninsula (fig. 6-1). The new locality<sup>2</sup> was discovered during a geologic mapping traverse along the south shore of Chinitna Bay (fig. 6-1; see project overview [chapter 1,

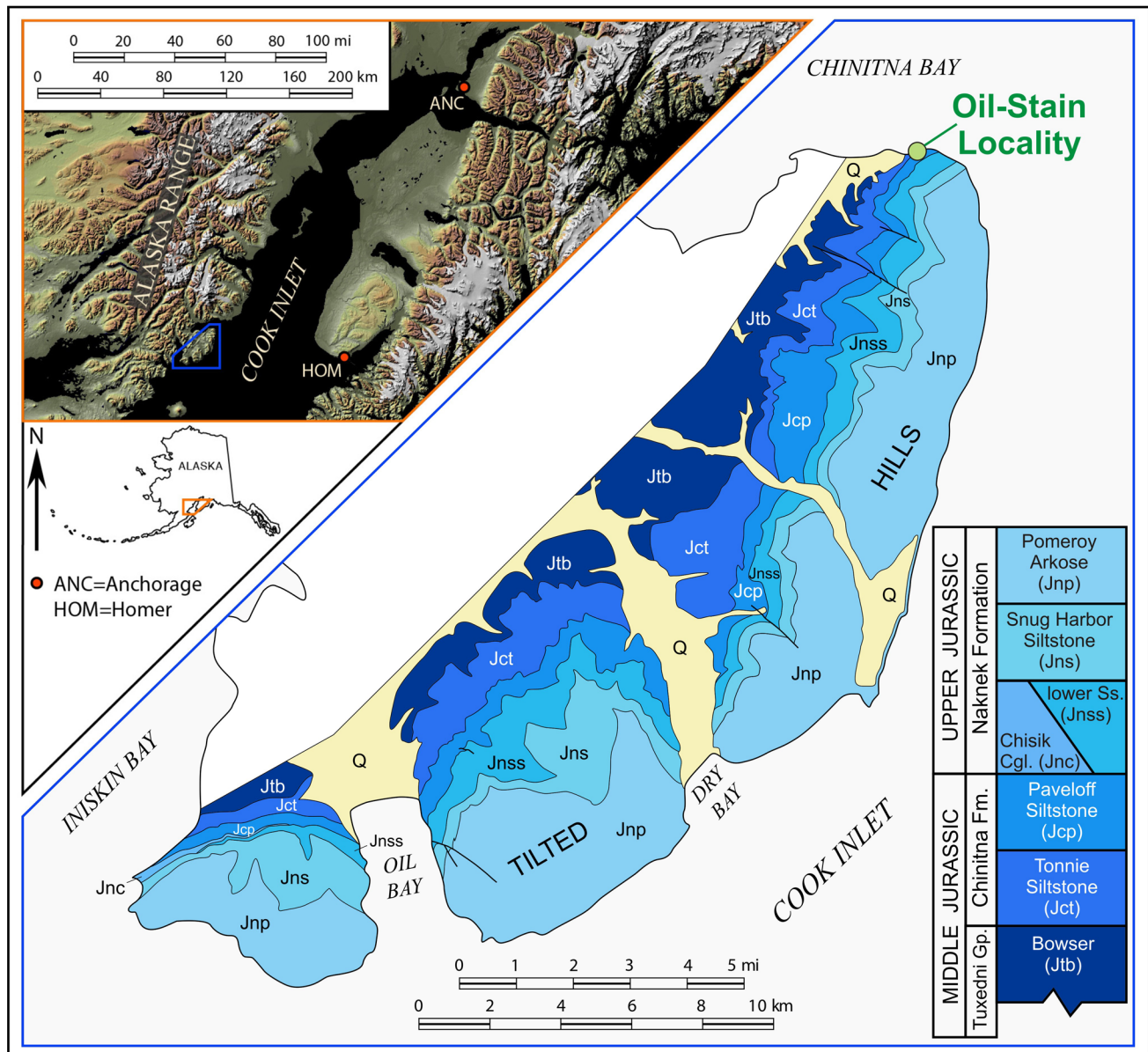


Figure 6-1. Shaded-relief location map of southern Alaska (upper left) and simplified geologic map of the Tilted Hills on the Iniskin Peninsula (modified from Herriott and Wartes [chapter 5, this volume]). Note the location of the oil-stained outcrop discussed in this study. Simplified stratigraphic column (lower right) is modified from Detterman and Hartssock (1966).

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<sup>2</sup>Location coordinates: N59.83472°; W153.01906° (NAD27AK)

this volume]). The outcrop is part of an east-dipping succession that includes the Middle Jurassic Chinitna Formation and much of the Upper Jurassic Naknek Formation (fig. 6-1). The excellent sea-cliff exposures can be correlated southward into the Tilted Hills (fig. 2-2; chapter 2, this volume).

The oil-stained interval lies within an approximately 100-m-thick sandstone-dominated package mapped as the lower part of the Paveloff Siltstone Member of the Chinitna Formation (figs. 6-1 and 6-2). The moderate to strong hydrocarbon odor was discovered in a sandstone boulder at the base of the outcrop, but is clearly derived from the adjacent cliff. The petroliferous zone is a gray-green- to gray-brown-weathering, very-thick-bedded, poorly sorted, structureless, lithic-rich, coarse-grained sandstone. The lack of apparent intra-bed grading or stratification suggests mass-flow deposition.

Samples of the oil-stained sandstone will undergo routine analysis for porosity and permeability. Thin sections cut from these samples will be evaluated for framework composition, sorting, and cements. These results will add to the growing database of reservoir quality information recently summarized in Helmold and others (2013). Samples were also collected for organic geochemistry and any extracted hydrocarbons will be compared against data from known source rocks (Magoon and Anders, 1992). Results from these follow-up studies will be published in subsequent reports. The presence of sufficient matrix porosity to host migrated oil raises the possibility that processes inhibiting reservoir quality in Jurassic sandstone may not uniformly impact the entire section. Additional reports will explore this unique occurrence and what might control the apparent preservation of modest porosity and permeability.

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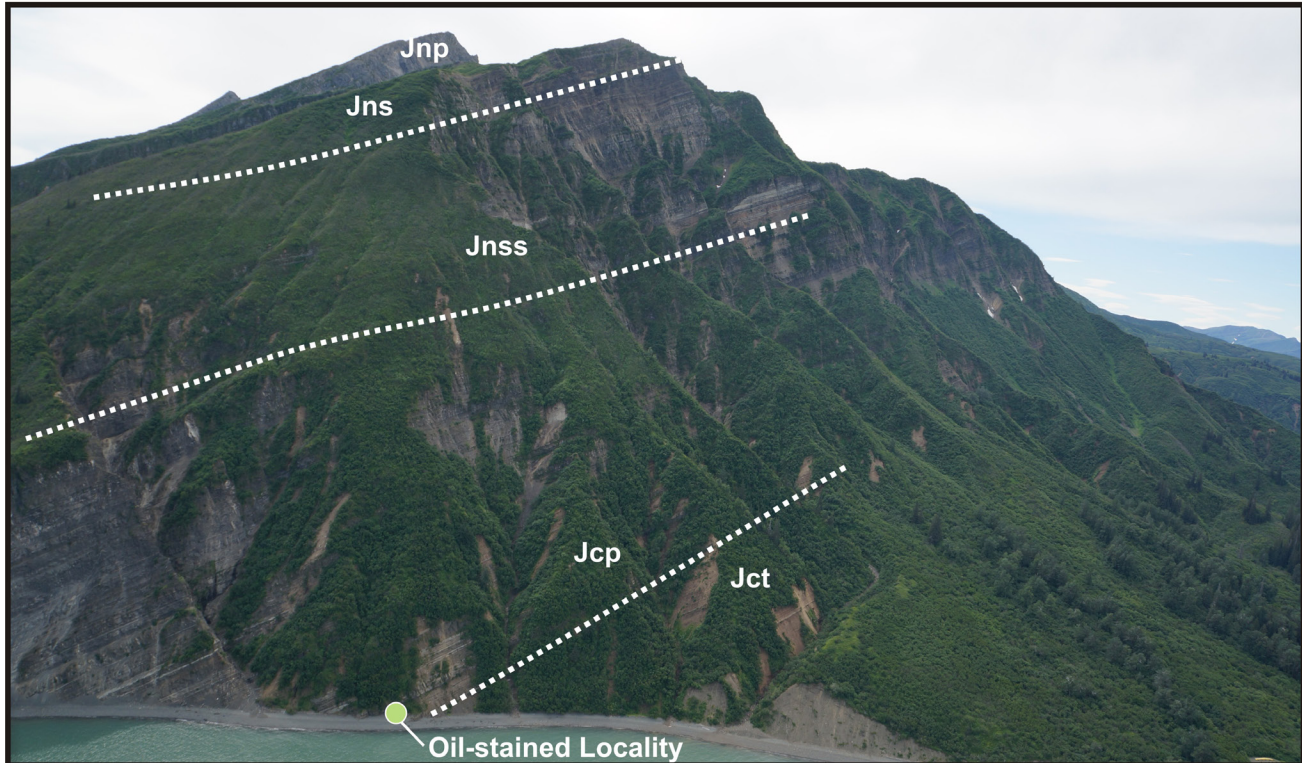


Figure 6-2. Annotated photo of the northern Tilted Hills on the Iniskin Peninsula. View to the south, with the south shore of Chinitna Bay in the foreground. Unit abbreviations for members of the Chinitna Formation: Jct = Tonnie Siltstone, Jcp = Paveloff Siltstone; members of the Naknek Formation: Jnss = lower sandstone, Jns = Snug Harbor Siltstone, Jnp = Pomeroy Arkose.

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