The Response of Puget Sound to the 2014–2015 North Pacific Warm Anomaly

Abstract

The flow of a considerably warm upper ocean North Pacific "Blob" water into Puget Sound, Washington, caused local and widespread warming that started from the onset of the water (three years after the Blob of 2014) through 2016. Here we report on several observations from Puget Sound, where temperature was more than 3 standard deviations above the normal by May. These anomalies were associated with lower than normal SSTs and high variability in the near-surface layer. Throughout the year, the surface waters were anomalously warm, with temperature anomalies ranging from 2 to 4 °C. The temperature anomalies persisted into the fall, with strong oceanic intrusion in 2015.

The Arrival of the Blob

The Blob first arrives on the Washington coast in October 2014 and continues into the fall. In 2015, there is no significant warming after the fall transition and anomalously warm waters persist into the spring, but not as extreme as in 2014.

Influence of Regional Weather

Regional air temperatures in 2014 and 2015 were well above normal. These anomalies were sustained as we monitored daily mid-depth water in Puget Sound, such as at Carr Inlet which experienced significant warming before the arrival of the Blob in Dec. 2014.

The 2015 Summer Intrusion and Fish Kill Event

Density (sigma-t) of the deep water in the southern part of Hood Canal showed a rapid drop between November 2014 and March 2015, during the period when the Blob arrived. Unlike in other years, density slowly increased over the spring and early summer of 2015, increasing more rapidly in the onset of the seasonal intrusion in July. This density change allowed a new, more dense intrusion to form in Hood Canal for a very early and strong oceanic intrusion in 2015.

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