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Salish Sea ORCA buoy observations over the last decade: warmer and saltier than normal anomalies and their persistence

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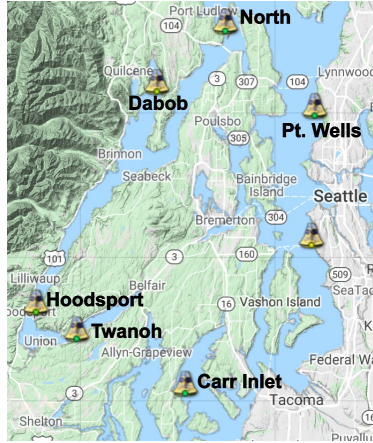
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Salish Sea ORCA buoy observations over the last decade: Warmer and saltier than normal anomalies and their persistence

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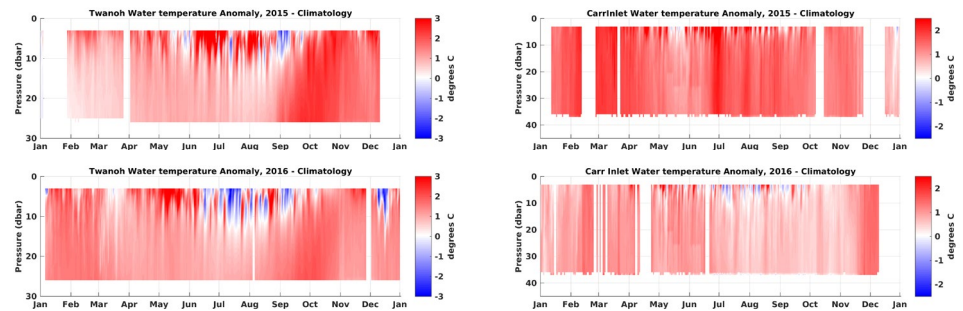


- Six ORCA (Oceanic Remote Chemical Analyzer) profiling buoys take frequent (1-4x/day) measurements of water properties over the water column in Puget Sound, and have been operating for over 10-15 years, depending on location.
- To investigate the effects of marine heat waves and summer droughts over the last decade, anomalies were calculated from the long-term climatology to see times of **higher than normal sea temperatures, possibly from marine heat waves (red)**, and times of **higher than normal salinities (red), possibly from summer droughts**.



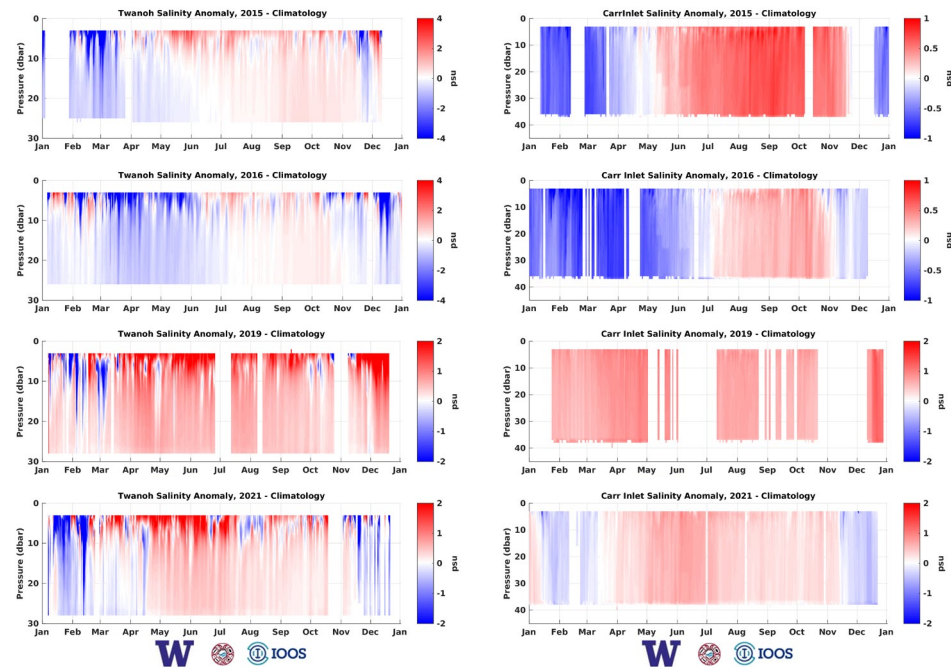
Some consistent temperature patterns:

All basins showed positive temperature anomalies year-round in 2015 and 2016, abating in 2017 and reprising in 2019, as exemplified by Twanoh and Carr Inlet 2015-16 data:



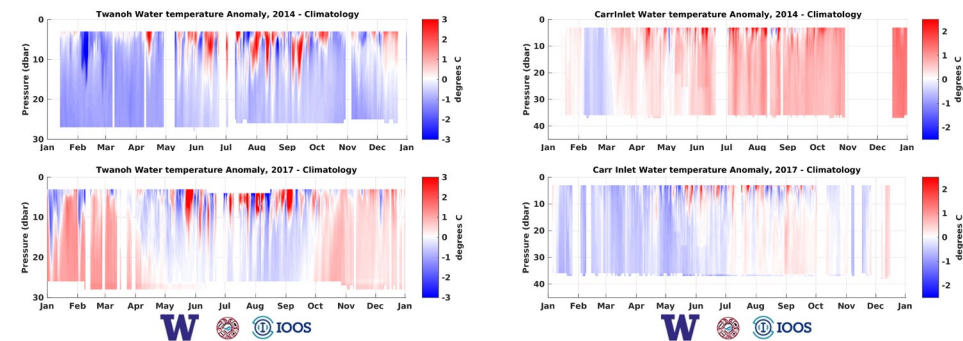
Salty anomalies lasting longer?

Positive salinity anomalies were evident during summer and early fall in 2014-16 in all basins, were absent during 2017, but since then (2018-21) have expanded to much more of the year. as exemplified by Twanoh and Carr Inlet data:



Some disparate temperature patterns:

Onset of anomalies, and seasonal patterns sometimes differ among basins. Full water column positive anomalies started in 2014 in Carr Inlet, but not until 2015 at Twanoh; seasonal anomaly patterns were somewhat opposite in these basins during 2017:



Upshot: Biology will be subject to different conditions, at times, among the basins, but in all, **positive temperature anomalies are more common in last decade**. In the last six years, only 2020 and 2017 did not have predominantly warmer than average seawater temperatures. **Higher than average salinities during summer** have been noted for all years since 2014, except 2017.