2019 climate and oceanography

2020 sea surface temperature forecasts
Sea Surface Temperature Anomalies

From NOAA’s Optimum Interpolation SST analysis

- Autumn 2018
- Winter 2018/19
- Spring 2019
- Summer 2019

Warmth in north delayed freezing

Modulation of temps, weak El Niño

Warm in EBS

Increase in warming in EBS/GOA and PNW. Beginning positive PDO pattern

Winter 2018/19
Suppressed storminess in GOA, related to development of warm SSTs

Promoted continuation of warm flow from S into EBS and WGOA

Highly unusual pattern with El Niño.
Strong S wind across Bering (2nd winter)

Suppressed storminess in BS/GOA, contributing to warmth

From the NCEP/NCAR Reanalysis project
Western Gulf of Alaska heatwave

Barbeaux

A. Hobday algorithm, through Sept 10, 2019
Western Gulf of Alaska heatwave
Barbeaux
Gulf of Alaska
Average Sea Surface Temperature
June through August, 1900 to 2019

Avg SST in area 52-61N, 130-160W

Data sources: NOAA/ERSSTv5
UAF/B. Brettschneider

Degrees C
Simulated surface drifter released from Ocean Station PAPA Dec 1 for 90 days

2014-2016 trajectories similar (S wind anomalies, heatwave years)

Directionality reflects wind patterns

2019 PTI reflects wind shift from westerly to southerly

Since 2005, ~5 yr periodicity
Eddies in the Gulf of Alaska

Seasonal cycles:
(c) High EKE in spring
(d) High EKE in fall

(c) Strong persistent eddy in 2016, currently average
(d) Currently average

E GOA: influenced by winds (climate and gap scale)
W GOA: influenced by propagation and intrinsic variability
Arctic sea ice extent
National Snow and Ice Data Center

2019 on track with record low year (2012)
- Delayed freeze-up in Chukchi
- Late Dec cold, northerly winds increased ice
- Southerly winds in Feb during ice retreat, rather than typical advance
EBS cold pool and temperatures
Overland, Ladd, Britt

- Second smallest cold pool in summer 2019
- Surface and bottom temps during the BT survey warm, similar to 2016
NINO3.4 - Weak to moderate El Niño event
PDO transition to positive, but not necessarily start of extended period
NPI reflects mostly high SLP in Aleutian Low area
NPGO implies weak west-wind drift in ENP and reduced flow into GOA
AO reflects high pressure in the Arctic
2020 Sea Surface Temperature Forecasts
SST Projections from the National Multi-Model Ensemble Bond

• Previous projections were warm, but not warm enough
• Projected continuation of warmth but reduced magnitude
• Warmest north of Kuroshio Extension
• Neutral ENSO projected