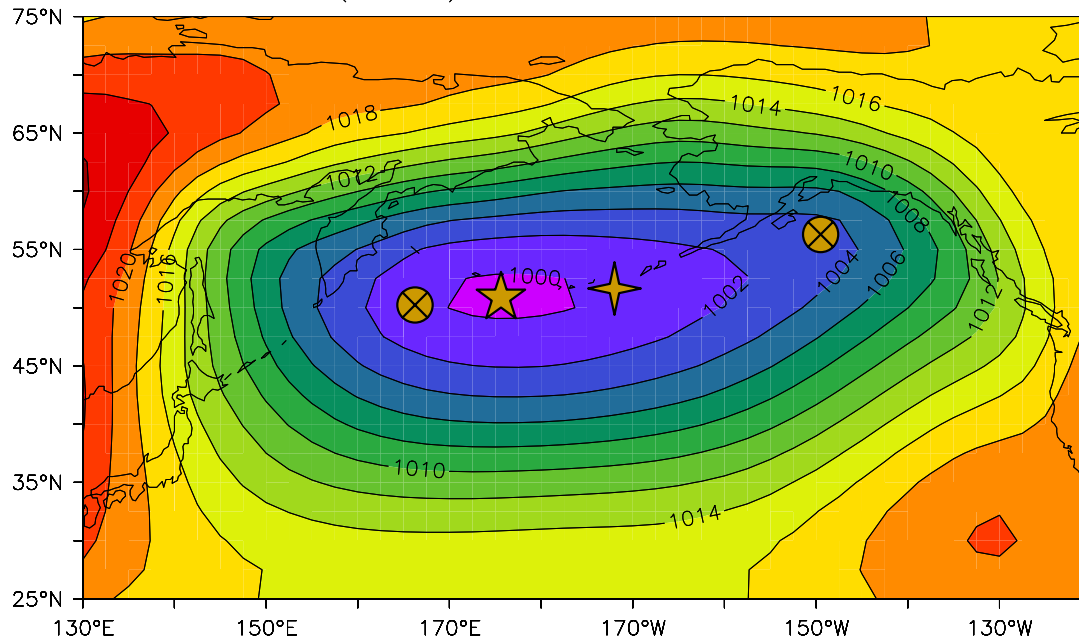


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# The Aleutian Low, Stormtracks, and Environmental Variability in the Bering Sea

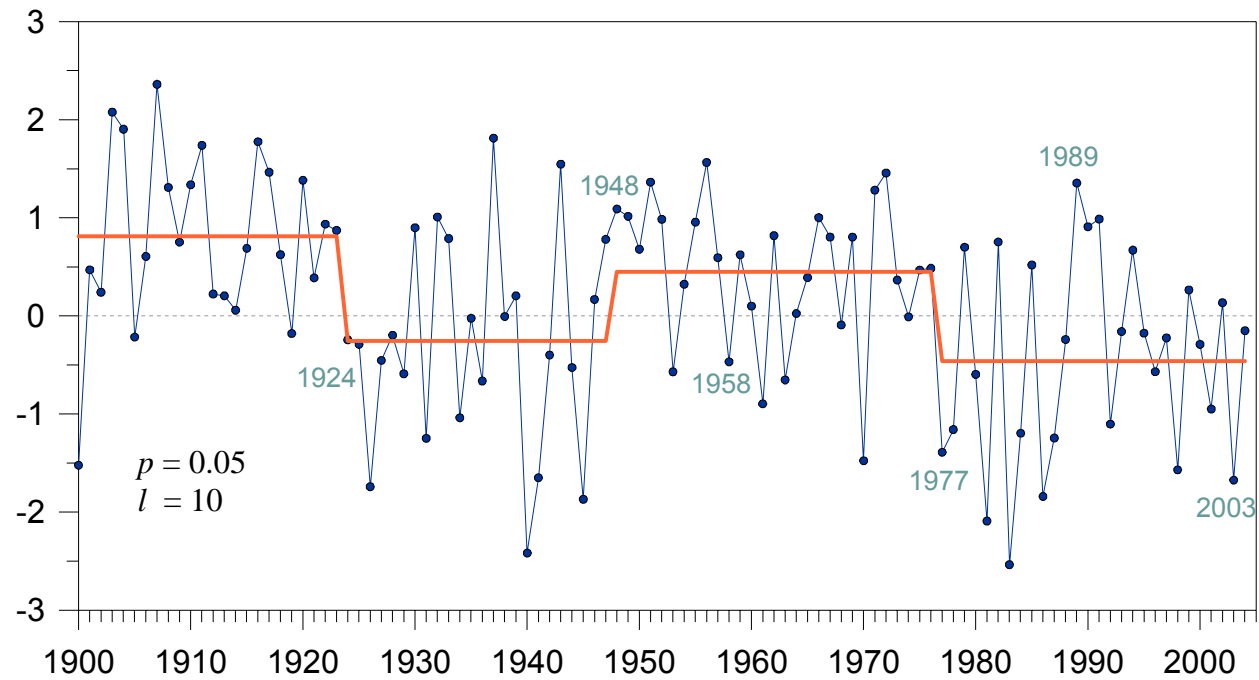
Mean winter (DJFM) SLP, 1950–2002



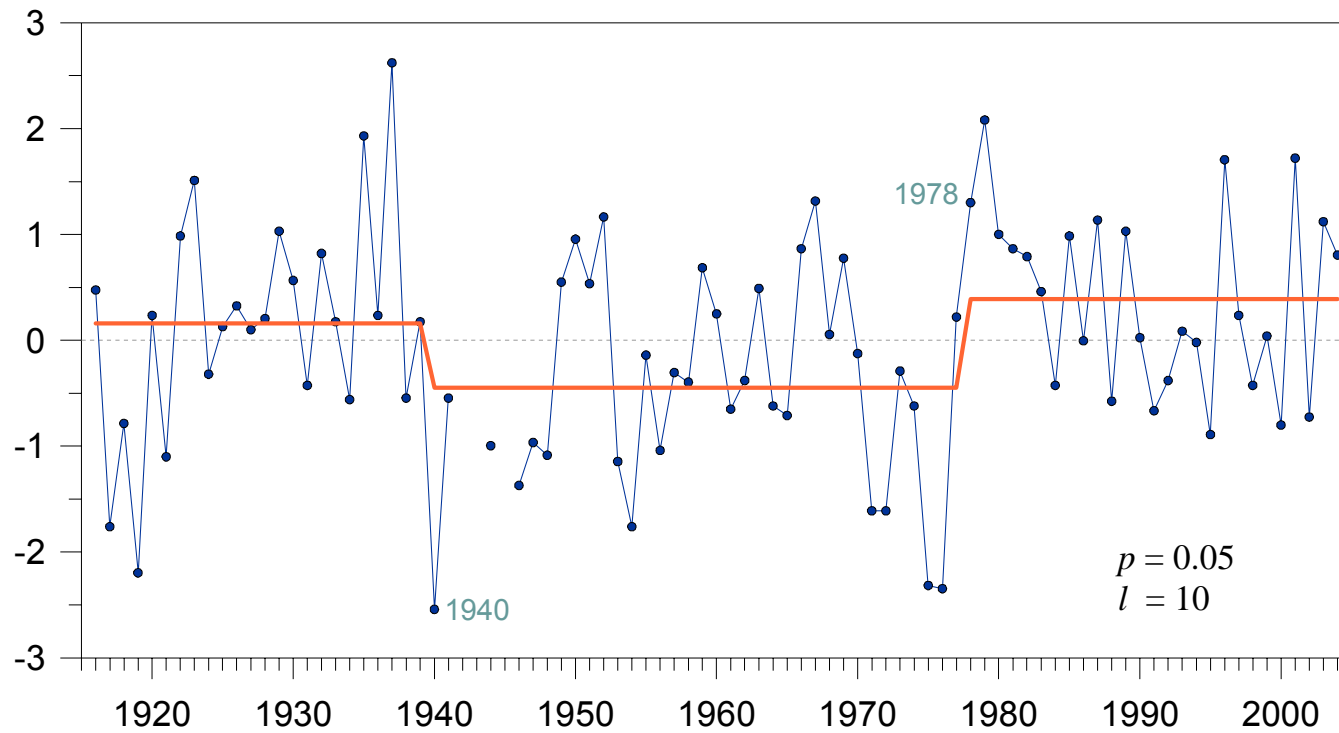
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Sergei Rodionov,  
James Overland,  
and Nicholas Bond.  
*PMEL/NOAA and  
U. of Washington, Seattle*

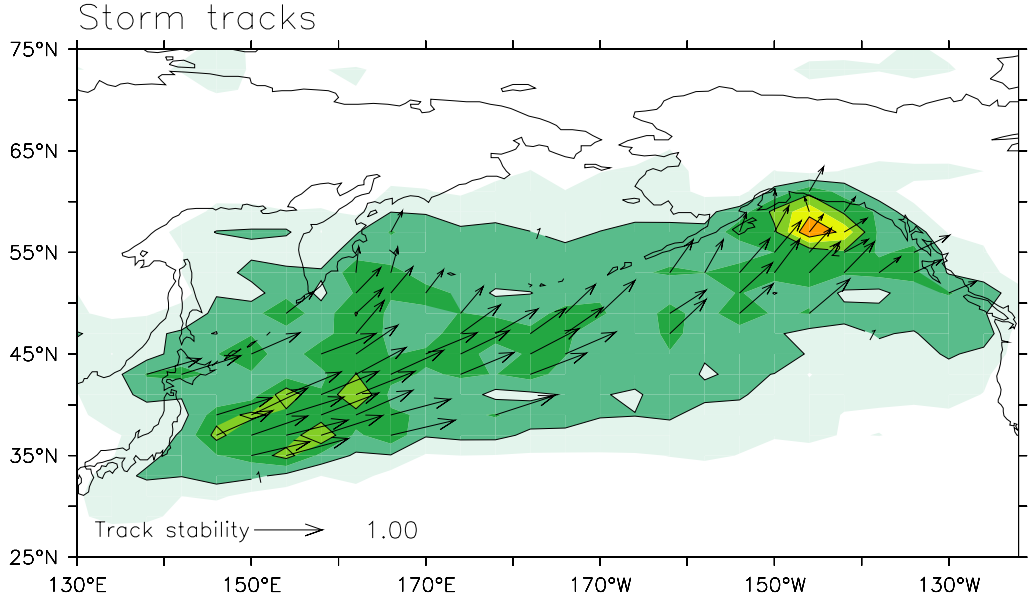
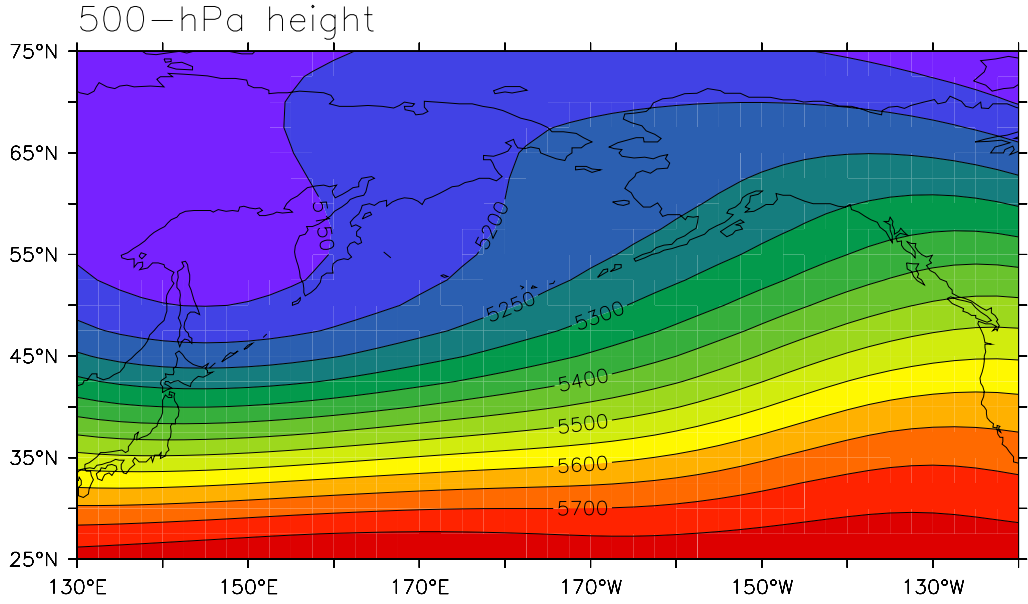
# The North Pacific Index (Nov-Mar), 1900-2004



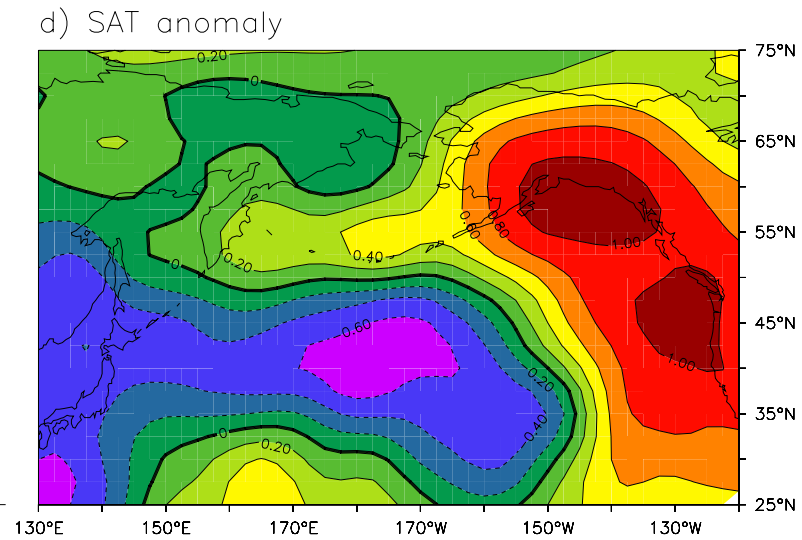
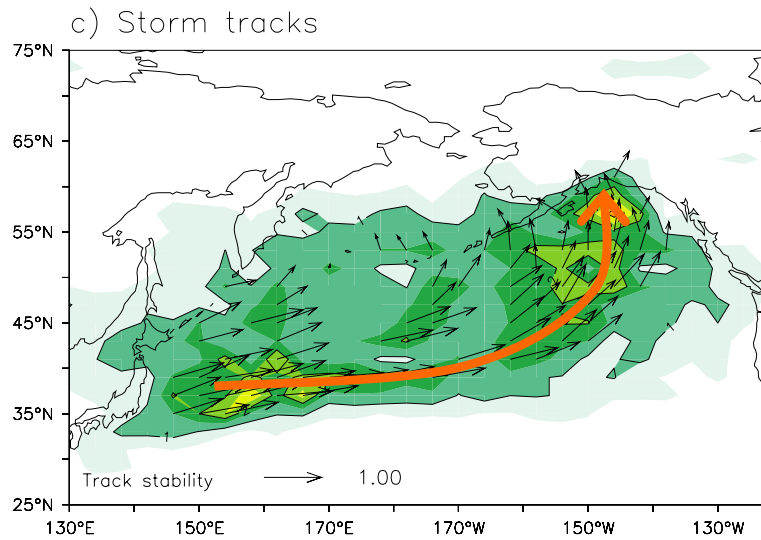
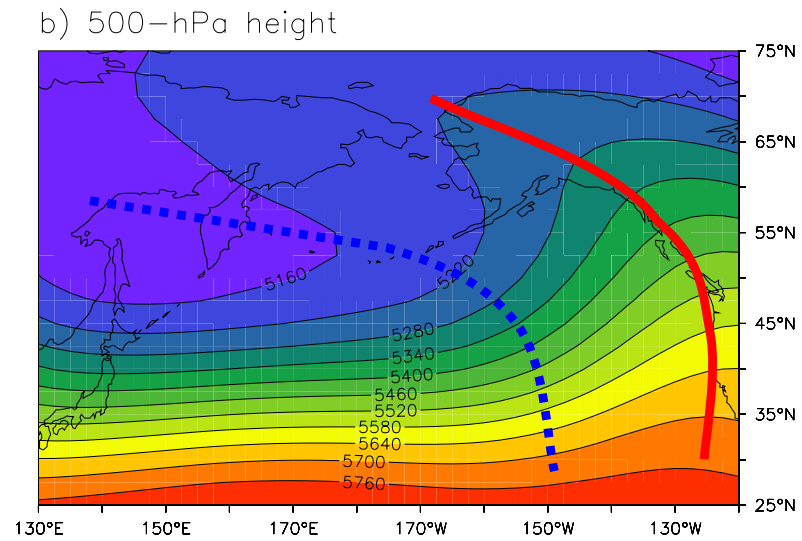
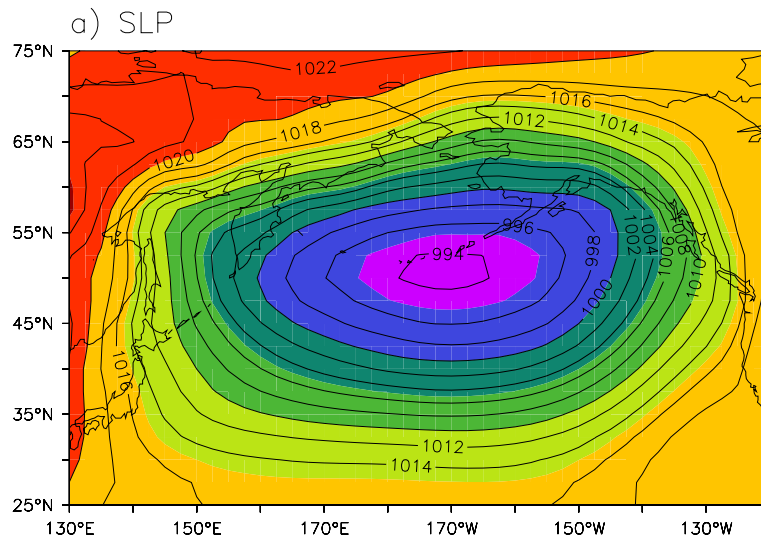
# Mean Winter SAT (DJFM) at St. Paul, 1916-2004



# Mean winter climatology



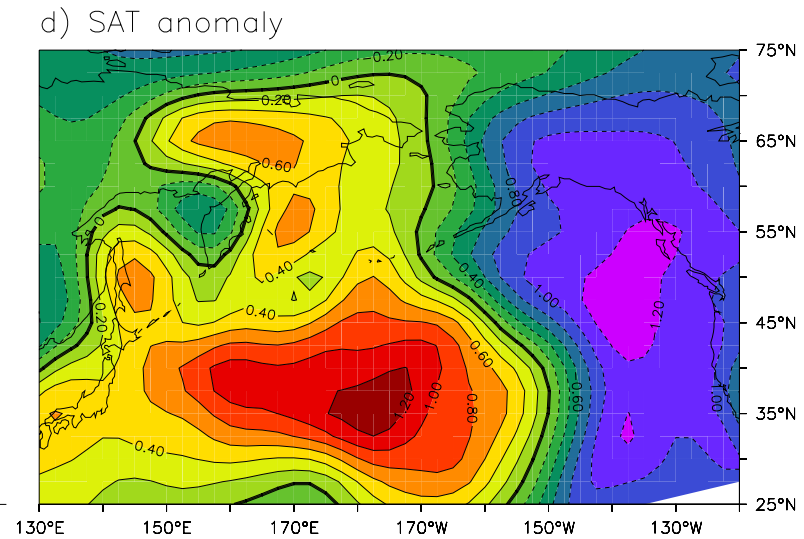
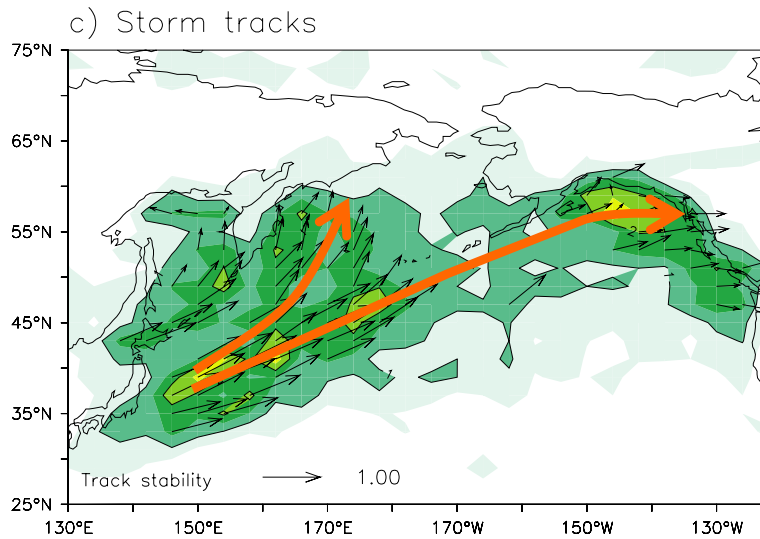
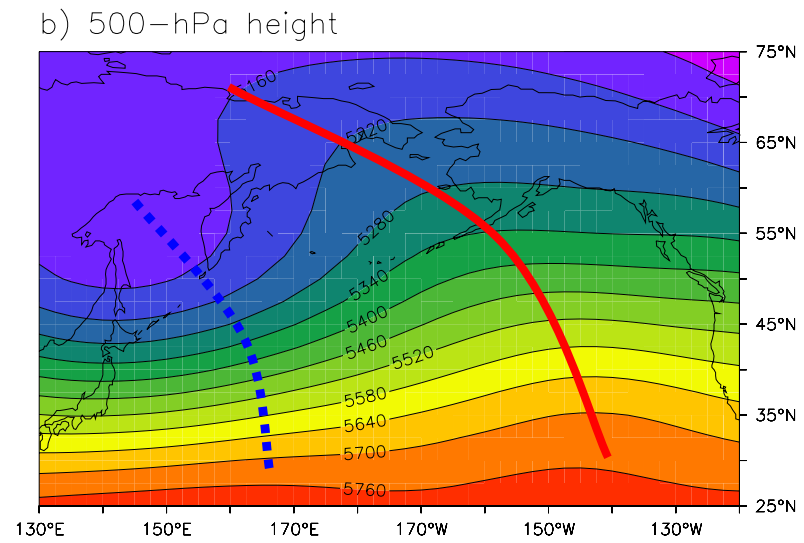
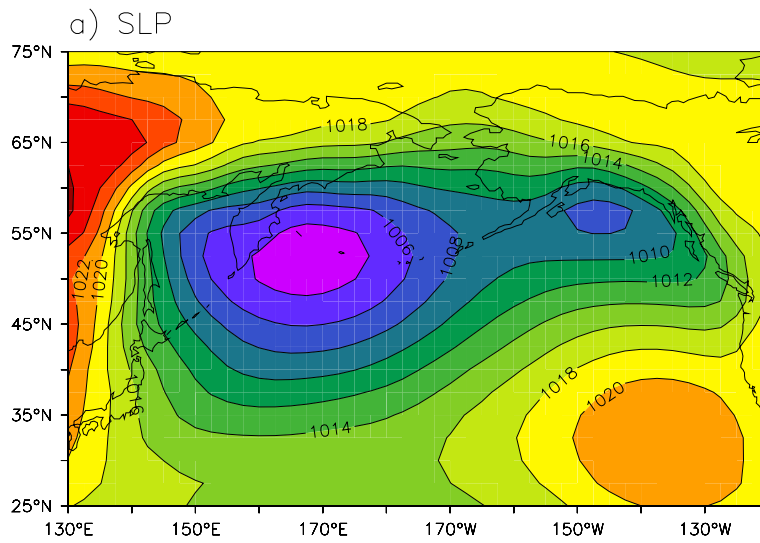
# Low NPI Composites



+PDO

Low NPI years: 1961, 1963, 1970, 1977, 1978, 1981, 1983, 1986, 1987, 1998

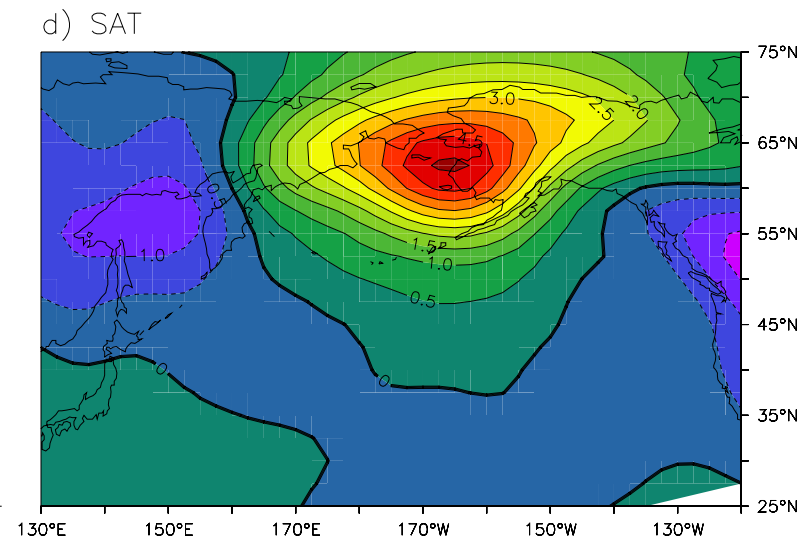
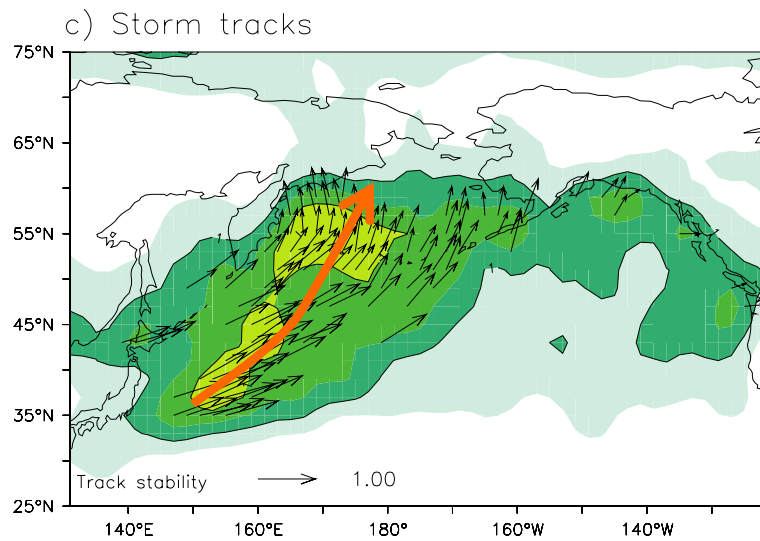
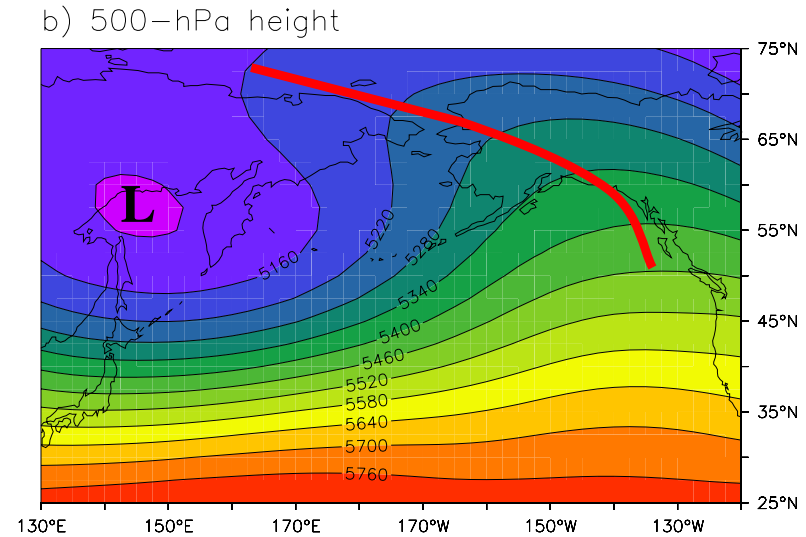
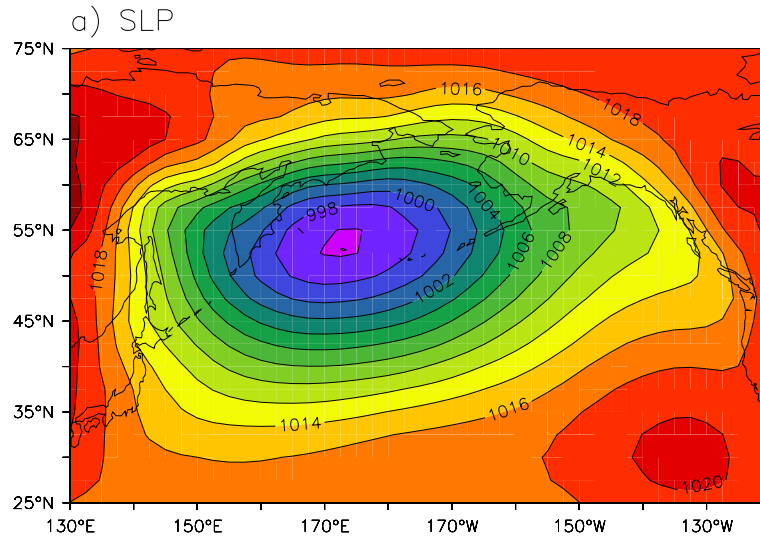
# High NPI Composites



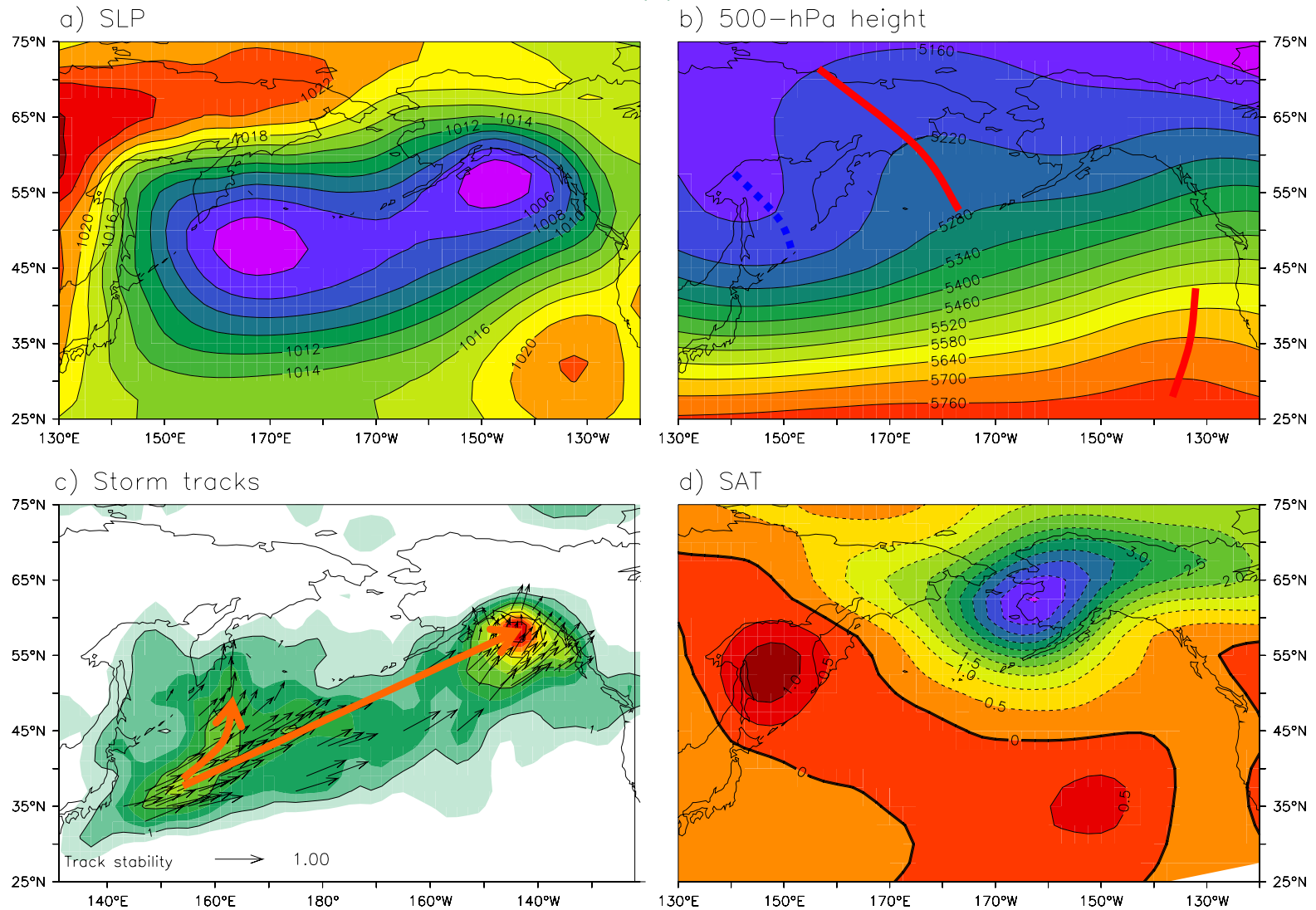
-PDO

High NPI years: 1950, 1952, 1955, 1956, 1957, 1969, 1971, 1972, 1979, 1989

# Major Circulation Pattern (W1) for Anomalously Warm Winters

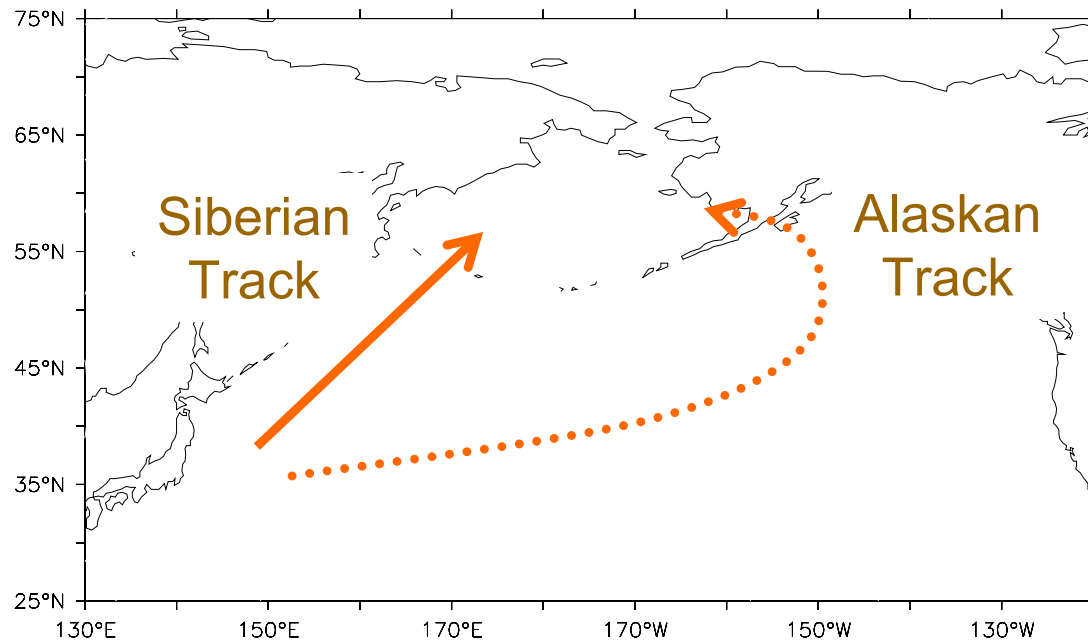


# Major Circulation Pattern (C1) for Anomalously Cold Winters





# Mild Winters: Siberian vs. Alaskan Storm Tracks



Period	Sib	AL	S/A
1922-02	0.83	0.34	2.4
1922-39	0.83	0.72	1.2
1940-76	0.73	0.05	13.5
1977-02	0.96	0.58	1.7

Siberian track: W1 + W2\* + W4\*

Alaskan track: W3+W5

\* The Aleutian Low is split into 2 centers

# The North Pacific Index (NPI) and SAT at St. Paul

1916-2004

NPI

		Neg	Pos	$\Sigma$
S A T	C	20	21	41
	W	21	24	45
	$\Sigma$	41	45	86

1922-1939

NPI

		Neg	Pos	$\Sigma$
S A T	C	4	0	4
	W	7	7	14
	$\Sigma$	11	7	18

1940-1976

NPI

		Neg	Pos	$\Sigma$
S A T	C	8	15	23
	W	2	9	11
	$\Sigma$	10	24	34

1977-2004

NPI

		Neg	Pos	$\Sigma$
S A T	C	7	3	10
	W	12	6	18
	$\Sigma$	19	9	28

# Correlation with NS wind anomalies at St. Paul (Nov – Mar)

R [NS wind – NPI] = -0.57

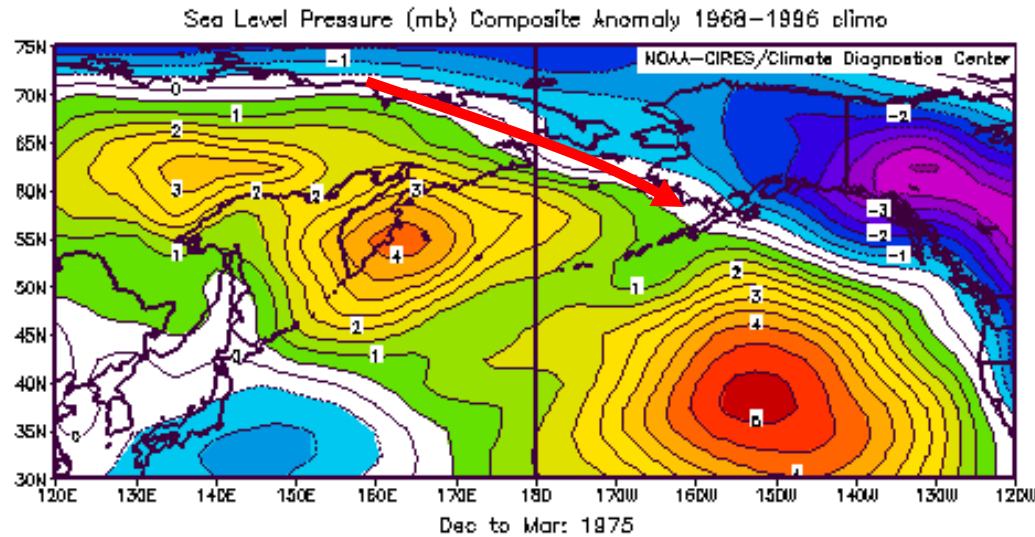
Data: 1949-2004

Variable	NPI > 0	NPI < 0
SAT, St. Paul	-0.80 (30)	-0.46 (26)

The difference between the correlation coefficients is statistically significant at  $p < 0.03$

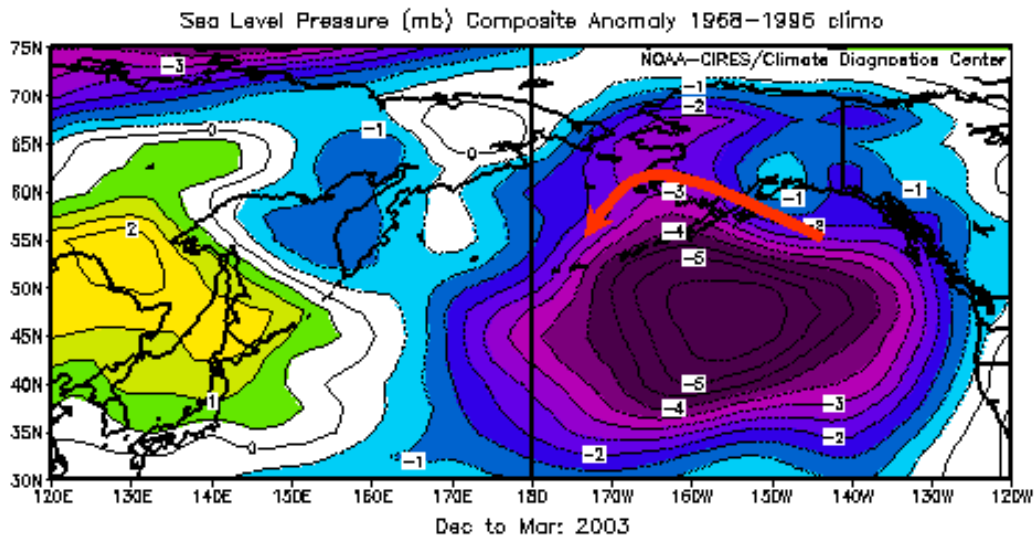
# SLP Anomalies During the Anomalously Cold (1975) and Warm (2003) Winters in the Bering Sea

Wind: 0.77 std  
SAT: -2.32 std  
NPI: 0.47



1975

Wind: 1.10 std  
SAT: 1.12 std  
NPI: -1.67



2003

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# Summary

- Regime-like changes in the severity of winters are associated with the NP circulation regimes expressed by the *strength* of the Aleutian low
  - Year-to-year SAT variations are associated with the *position* of the Aleutian low or stormtracks
  - The majority of warm winters occur when the Siberian storm track is active
  - During the regimes of a strong Aleutian low, the number of storms along the Alaskan track substantially increases
  - The association between the northerly winds and SAT substantially weakens when the Aleutian low is strong.
-