

## Storm Track Monitoring and Prediction-Related Activities at CPC

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# Outline

1. Motivation
2. Alaska Collaboration (background, initial work)
3. Monitoring Examples (climate-weather linkage)
4. Weekly, Subseasonal, Seasonal Possibilities
5. Summary

## Presentation Purpose

- Publicize current CPC storm track activities to this user community
- Solicit feedback and suggestions
- Build an initial linkage with interested RISAs and other partners

### Expected Outcome:

→ Strategy of how to best focus resources when developing storminess related monitoring, assessment, and prediction products at multiple time scales

## Alaska Collaboration – Motivation

- Storminess has received increasing attention as wind, precipitation, and wave action are having an increasing impact along coastlines
- Socioeconomic impacts are far reaching and extremely costly
- NWS Alaska interested in the prospects of storminess related products

### CPC would work towards:

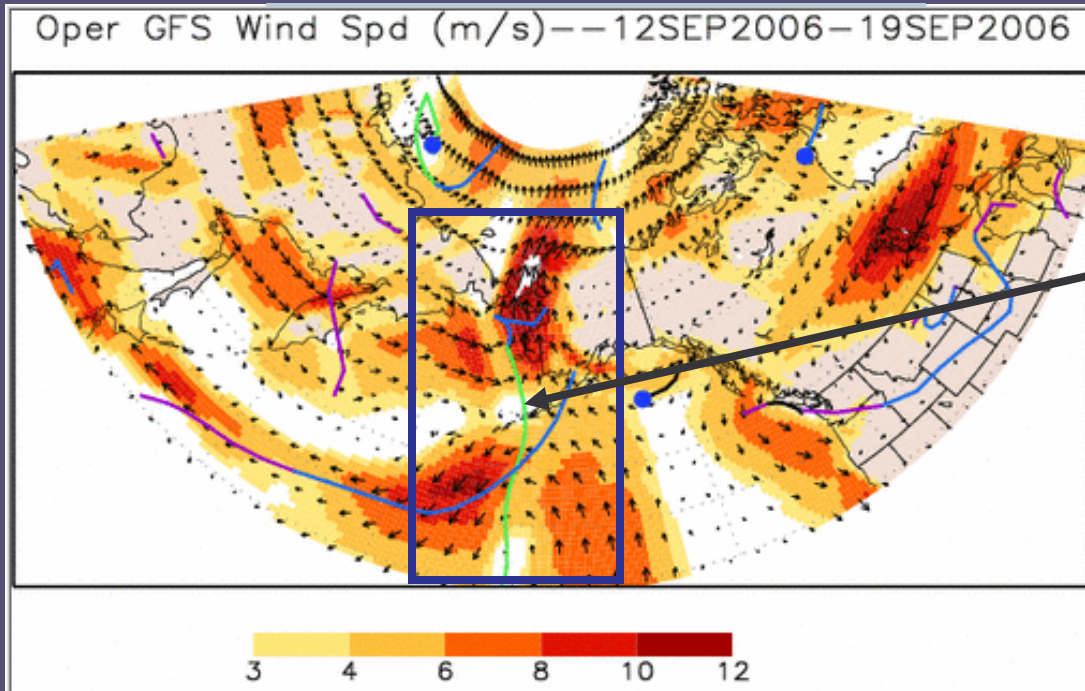
1. Alaska Monitoring (initial version complete)
2. Development of a storminess index (monitoring, research)
3. Study the feasibility of subseasonal / seasonal storminess guidance (diagnostic studies, CFS forecasts, etc.)

## Alaska Collaboration – Initial Work

- CPC/CTB liaison to Alaska RISA (POC: Daniel White)
- Developed Alaska storm track monitoring web page
- Two relevant and important examples:
  - ➔ Deep cyclones in the Bering Sea → wave action along the west coast
  - ➔ Extratropical transition of Pacific Ocean tropical cyclones

# Alaska Collaboration – Monitoring Examples

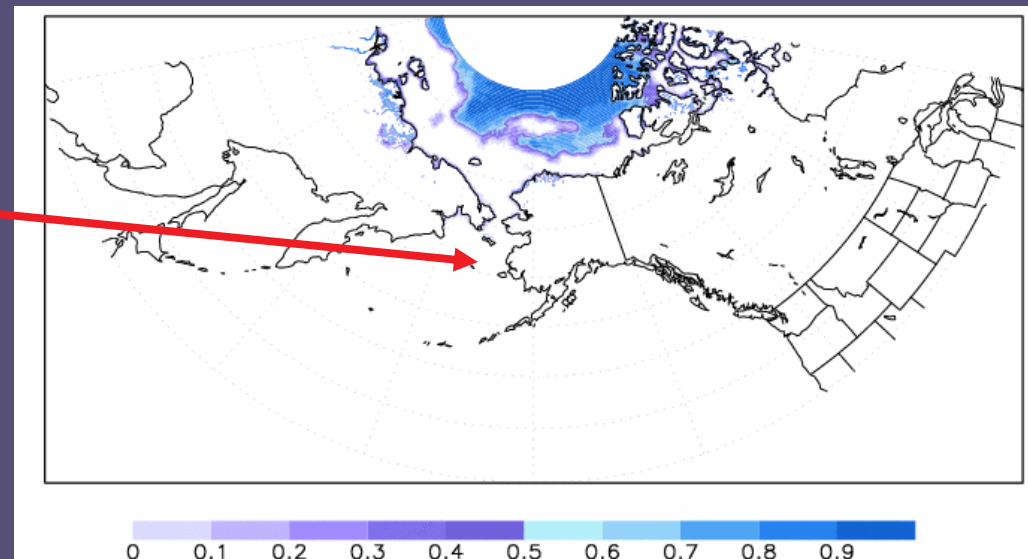
## 925 hPa Wind Anomalies



Strong cyclone enters and slows in the Bering Sea. Wind and wave action for the west coast increases.

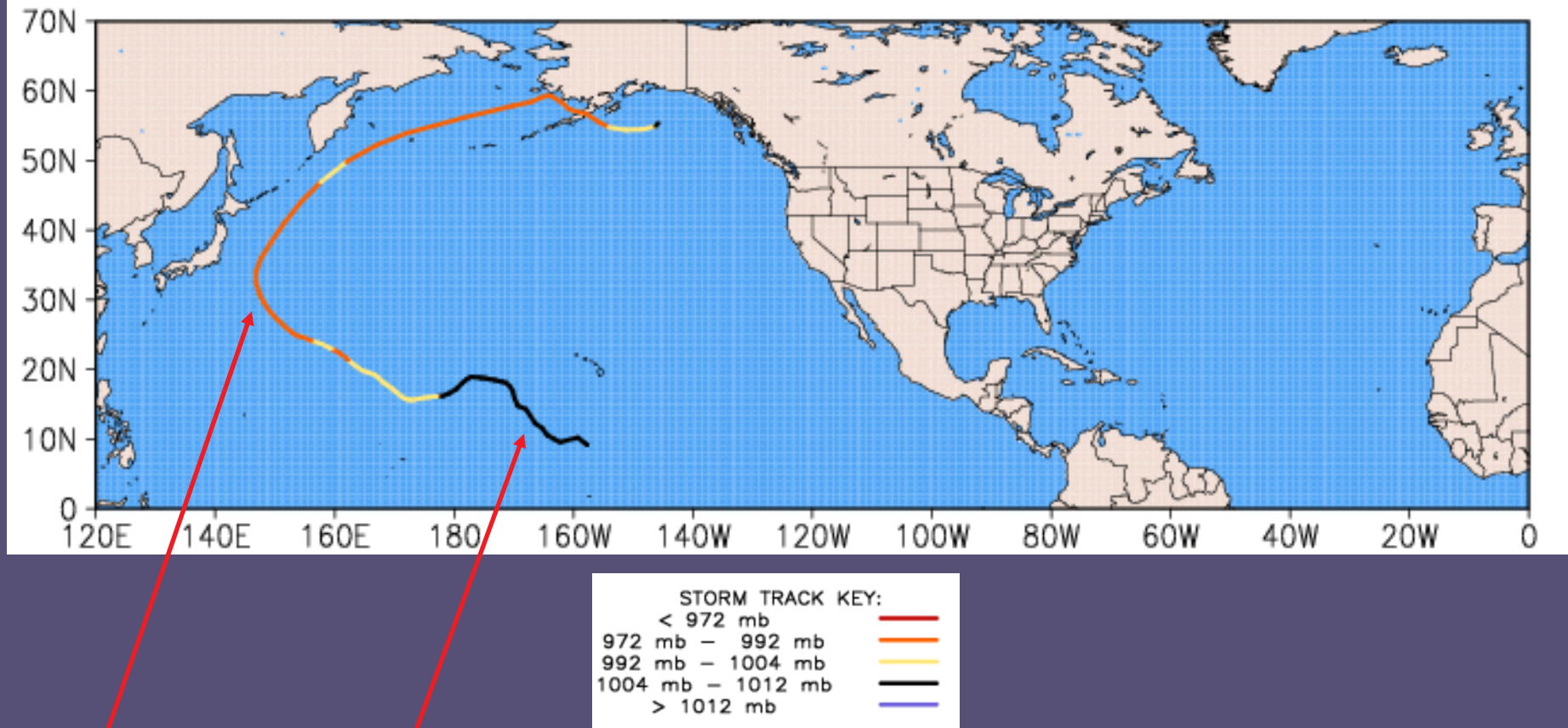
During late summer and fall, storminess in the Bering Sea is important to monitor. Waters are free of sea ice.

## Average Sea Ice Fraction



# Alaska Collaboration – Monitoring Examples

## Hurricane Ioke August-September 2006



Hurricane Ioke develops south of Hawaii, recurves east of Japan, becomes extratropical and impacts the southern sections of Alaska.

# Storm Track Monitoring Specifics

<http://www.cpc.ncep.noaa.gov/products/precip/CWlink/stormtracks/mstrack.shtml>

- Global coverage (NH, SH, Alaska)
- Overlays of precipitation, low-level wind anomalies, wave heights, and sea ice (Alaska only)
- Monitoring products (10, 30, 90 days)
- Forecast products (operational and ensemble mean GFS; week 1 and 2)

All CPC Go

Climate Outlooks

Climate & Weather Link

El Niño/La Niña

MJO

Teleconnections

AO

NAO

PNA

AAO

Blocking

Storm Tracks

Climate Glossary

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## Storm Tracks

- [Short-Term Monitoring, Outlooks, and Assessment](#)
- [Storm Days](#)
- [Climatology and Composites](#)
- [Publications](#)

Storm tracks are based on an algorithm developed at the Climate Diagnostics Center (CDC) [Serreze (1995), and Serreze et al. (1997)]. Storm tracks are identified by locating grid points in which the sea level pressure (SLP) is less than its surrounding grid points by at least 1 hPa. The storms are tracked by analyzing the position of systems between time steps and applying a maximum distance threshold between candidate pairings (800 km) and additional other quality control checks. Red/blue dots indicate active storms as of 18 UTC for the respective plot ending date.

- **Short-term Monitoring, Outlooks, and Assessment**

Note: Move cursor over product name to display the graphic.

Storm Tracks/Precipitation						
10-day	30-day	90-day	OGFSW1	EGFSW1	OGFSW2	EGFSW2

Storm Tracks/925hPa Anomalies						
10-day	30-day	90-day	OGFSW1	EGFSW1	OGFSW2	EGFSW2

Storm Tracks/Wave Heights						
10-day	30-day	90-day	OGFSW1	EGFSW1		

Cyclogenesis/Cyclolysis Locations			Storm Track Assessment			
10-day	30-day	90-day	Graphic	Discussion		

10 day Total Precip (mm) -- 10FEB2007--19FEB2007

STORM TRACK KEY:

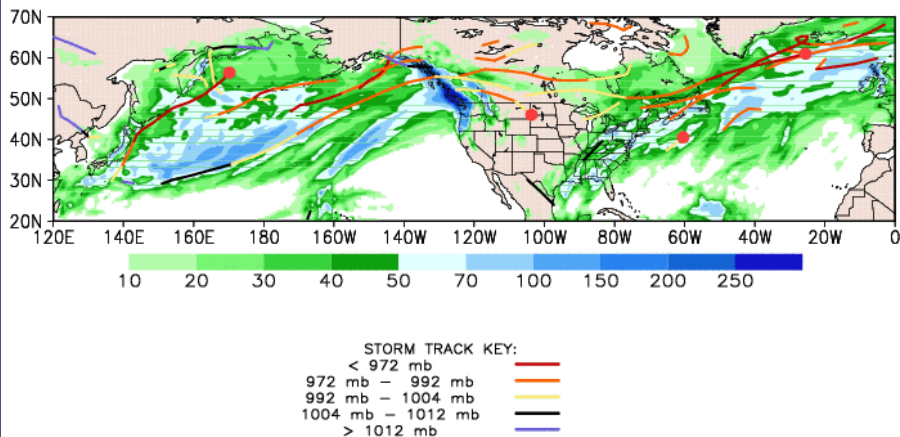
- < 972 mb
- 972 mb - 992 mb
- 992 mb - 1004 mb

## Storm Tracking Details

- Identifies mean sea level pressure (MSLP) minima
  - (Serreze (1995), Serreze et al. 1997)
- Tracking is based on a nearest-neighbor approach for identified storms between successive time periods
  - Maximum distance threshold between candidate pairings (800 km)
  - Maximum distance moved north, south, or west restrictions applied
- Uses Global Data Assimilation System (GDAS) and GFS data
- Data is converted to an equal area projection for tracking purposes

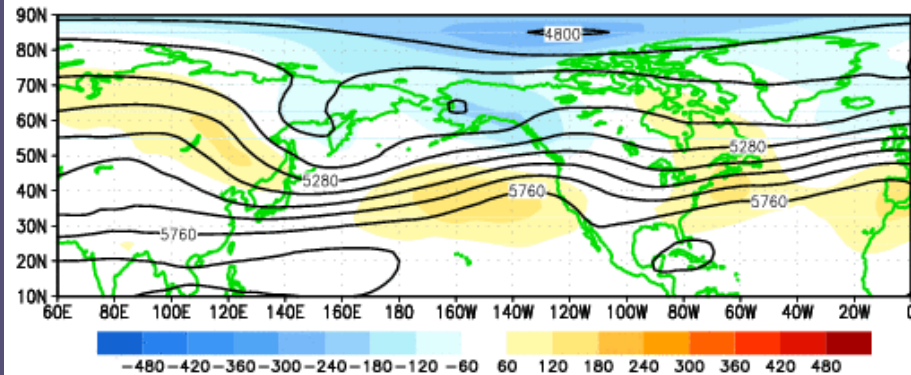
# Monitoring Examples – January 2007

10 day Total Precip (mm)--01JAN2007-10JAN2007

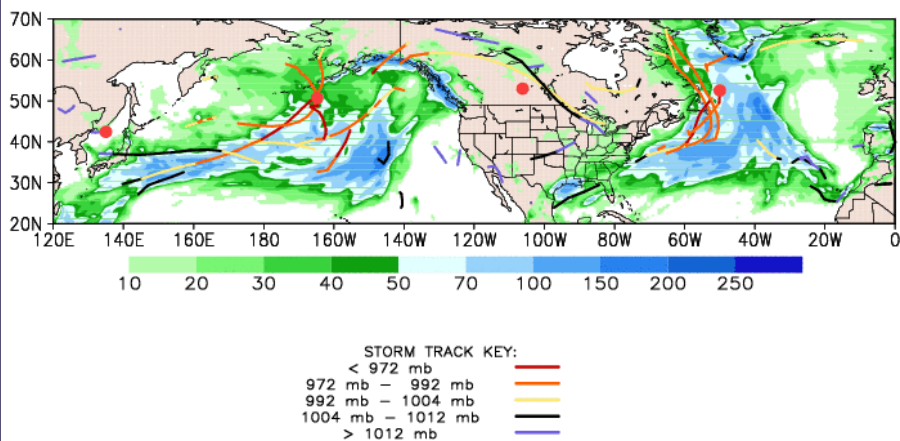


500 hPa Mean Height (contour) and Anomalies (shaded, m)

01 JAN 2007-10 JAN 2007

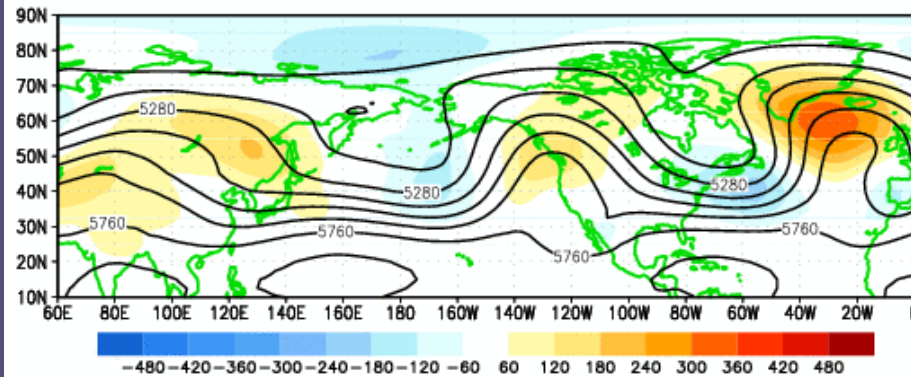


10 day Total Precip (mm)--21JAN2007-30JAN2007



500 hPa Mean Height (contour) and Anomalies (shaded, m)

21 JAN 2007-30 JAN 2007

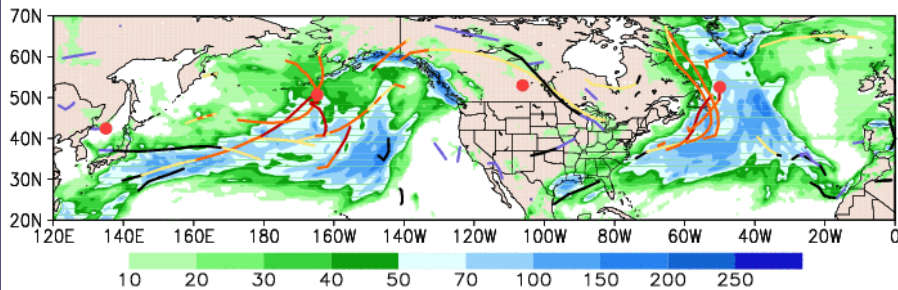


# Monitoring Examples – January 2007

10 day Total Precip (mm) -- 01JAN2007 - 10JAN2007

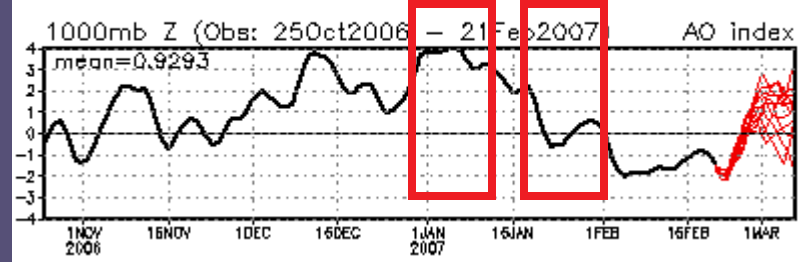


10 day Total Precip (mm) -- 21JAN2007 - 30JAN2007

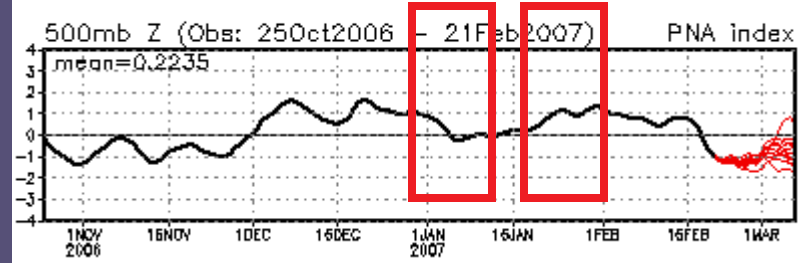


STORM TRACK KEY:  
< 972 mb: Red line  
972 mb - 992 mb: Orange line  
992 mb - 1004 mb: Yellow line  
1004 mb - 1012 mb: Black line  
> 1012 mb: Blue line

AO: Observed & ENSM forecasts



PNA: Observed & ENSM forecasts



Illustrates the linking of climate and weather

--Would like to extend that line to read:

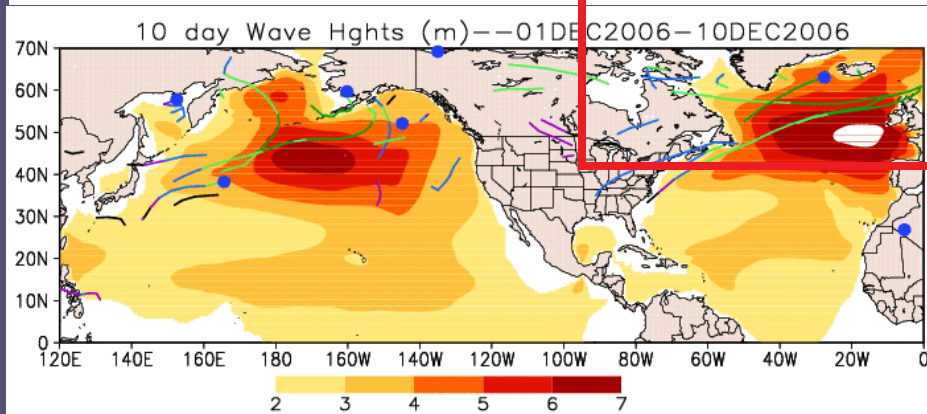
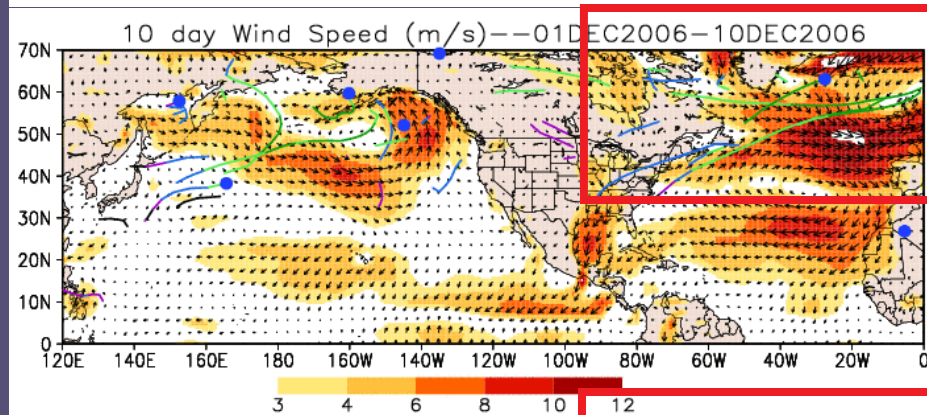
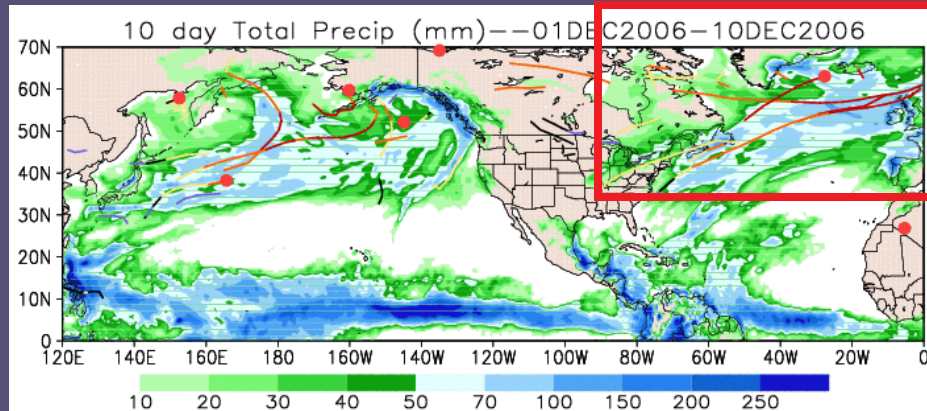
→ Illustrates the linking of climate and weather for realtime, specific applications

--How can we work with you to make this happen?

--Is this information useful? If not, how can we make it useful?

# Model Storm Tracks – Weeks 1-2

## Forecast Hazard Applications:



- Active period of heavy precipitation, strong winds, and strong wave action

- Best ways to utilize this information:

- Show ensemble mean only?

- Show tracks from all GFS ensemble members?

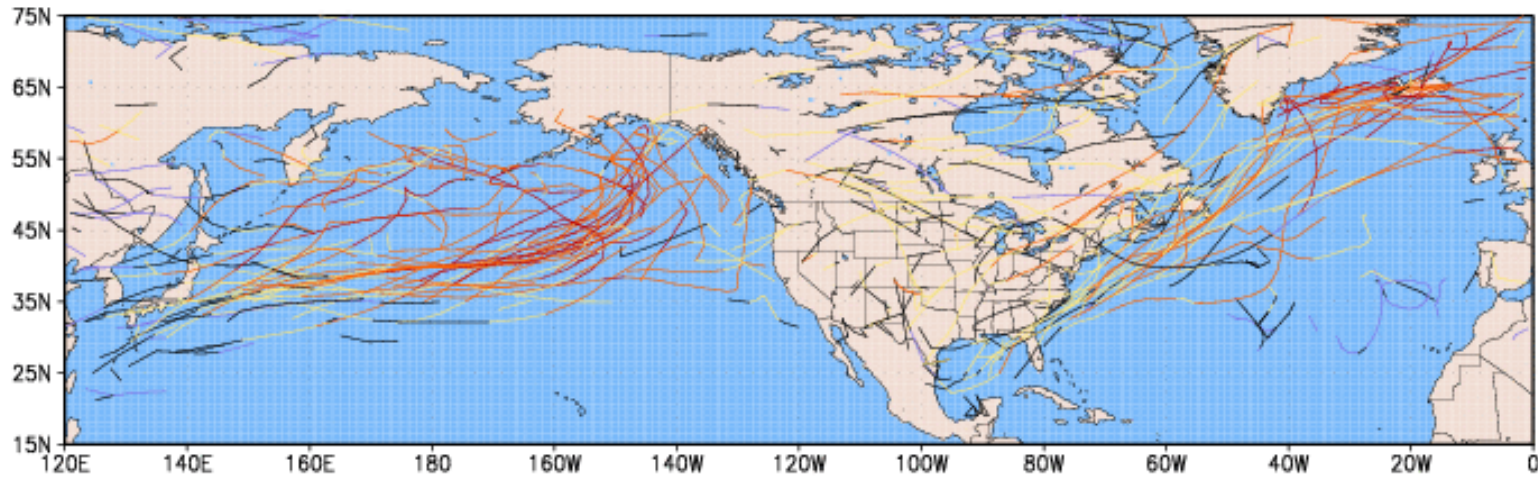
- Focus on each event during the period and not on weekly averages?

# ENSO Examples

El Nino

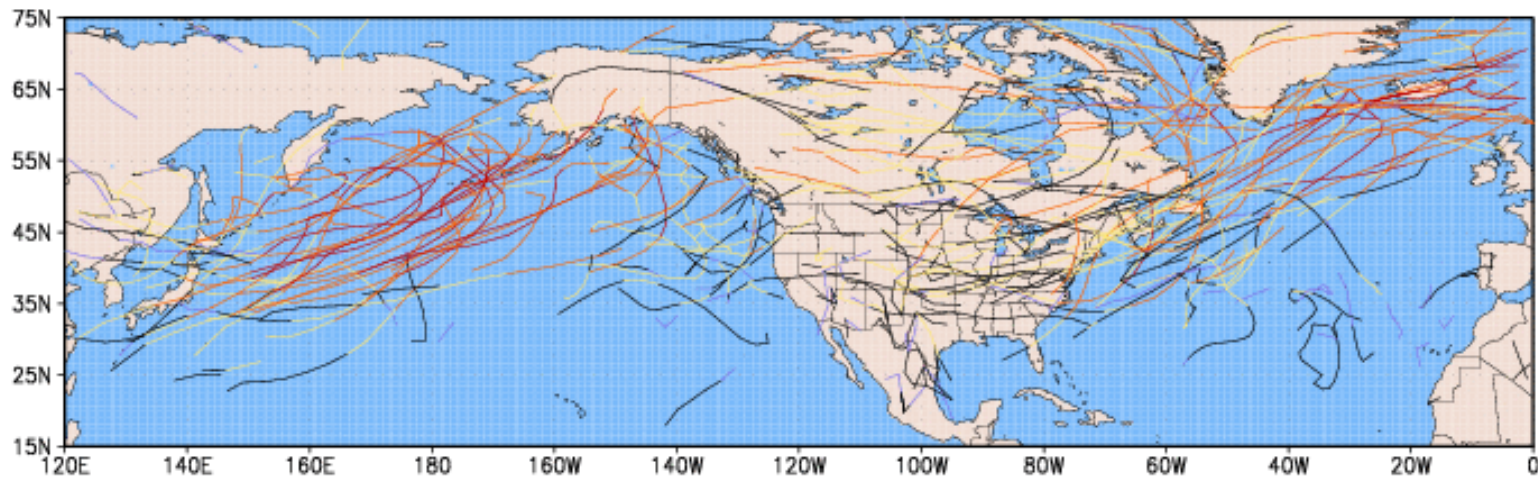
STORM TRACK KEY:	
< 972 mb	Red
972 mb - 992 mb	Orange
992 mb - 1004 mb	Yellow
1004 mb - 1012 mb	Black
> 1012 mb	Purple

Storm Tracks--GR--JFM--1983



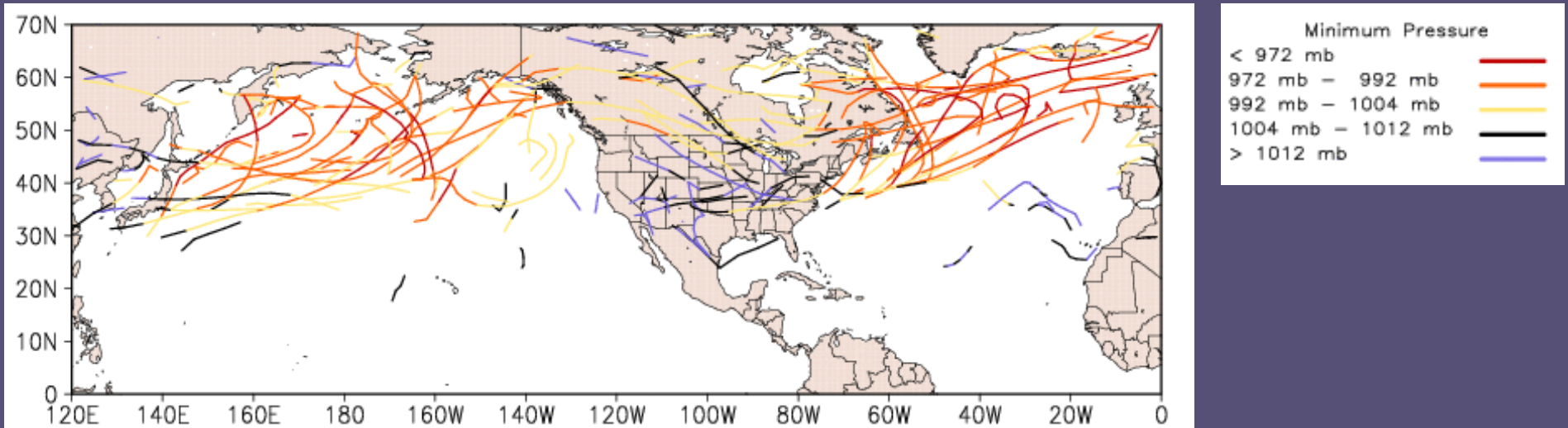
La Nina

Storm Tracks--GR--JFM--2000

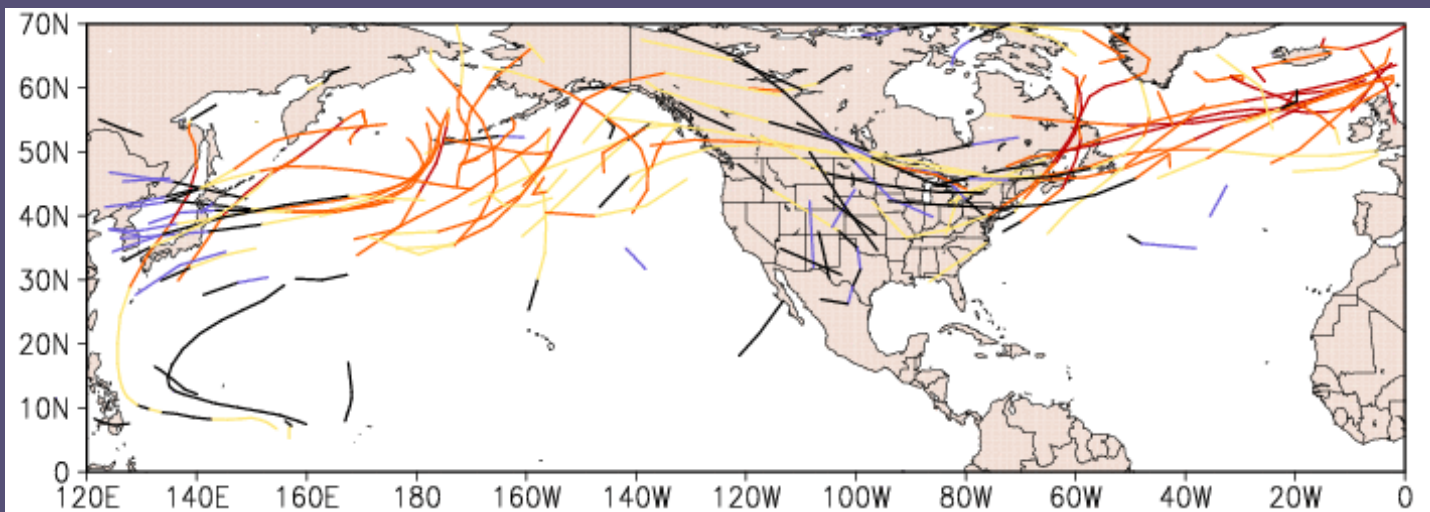


# Model Storm Tracks – Subseasonal/Seasonal

CDAS storm tracks (January 6, 2007 - February 20, 2007)



Climate Forecast System (CFS) storm tracks (January 6, 2007 Forecast)



## Summary

- Illustrated monitoring/assessment and prediction related examples
- Initial collaboration has focused on Alaska but we would like to connect with other RISAs, partners if appropriate
- We have the potential to engage the application community with storminess related products at multiple time scales
- **BUT ..... we need to know the best way to do this!**
- **Please let us know if and how we can contribute!**