



NOAA RESEARCH • ESRL • PHYSICAL SCIENCES DIVISION

## Theme 2: Understanding the Physical System

### *Atmosphere and Ocean Dynamics* *Overview*

George Kiladis

Science Review  
12-14 May 2015  
Boulder, Colorado



# Atmosphere and Ocean Dynamics

Much of what we do under this theme involves *Interactions Across Multiple Time and Space Scales*



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*...as well as providing targets for model validation and development*

## Atmosphere and Ocean Dynamics

PSD 2010 Strategic Goal Addressed:

Improve Observations and Understanding of Earth System Processes

NOAA Strategic Goal Addressed:

Improved Scientific Understanding of the Changing Climate System and its Impacts

Specific NOAA Goals in the 5-Year Plan:

1. Atmospheric and Oceanic Observations Integrated into Earth System Modeling
2. Improved Understanding of Interactions and Processes of Key Oceanic, Terrestrial, and Atmospheric Components of Earth's Climate System

Specific OAR Science Goals:

What is the State of the Climate System and How is it Evolving?

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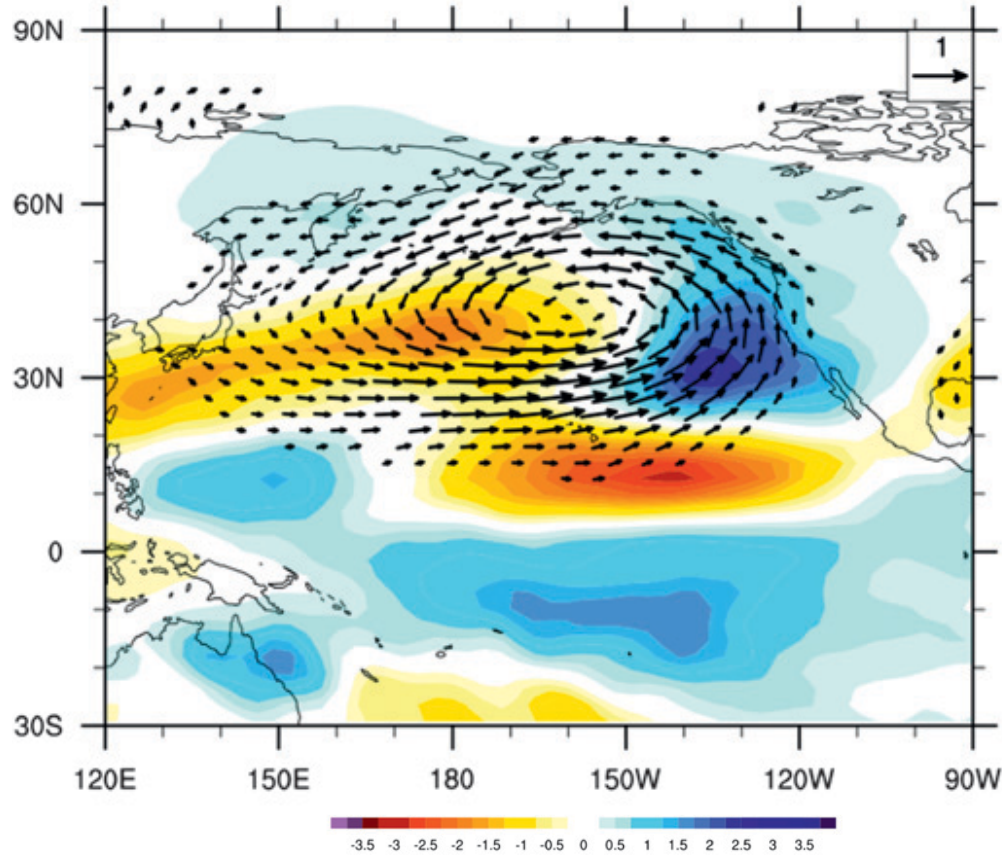
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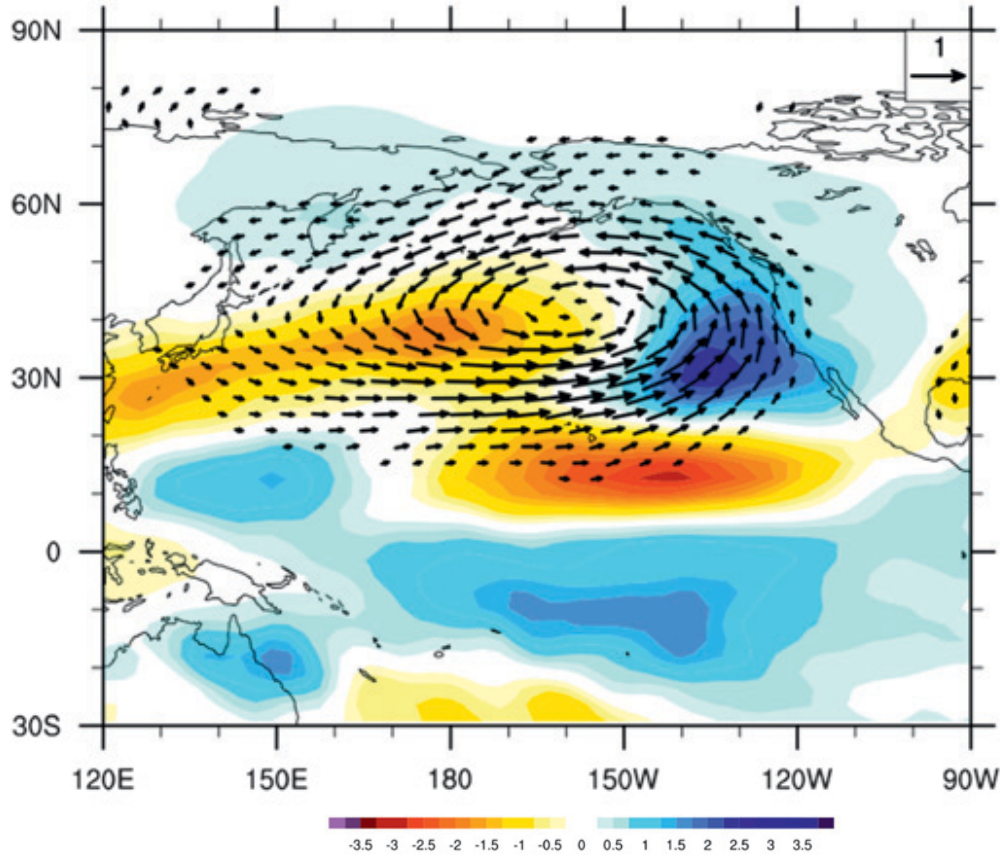
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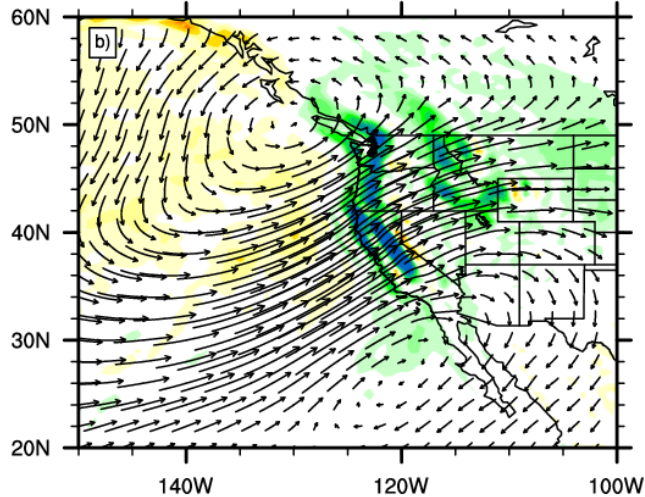


*What are the Moisture  
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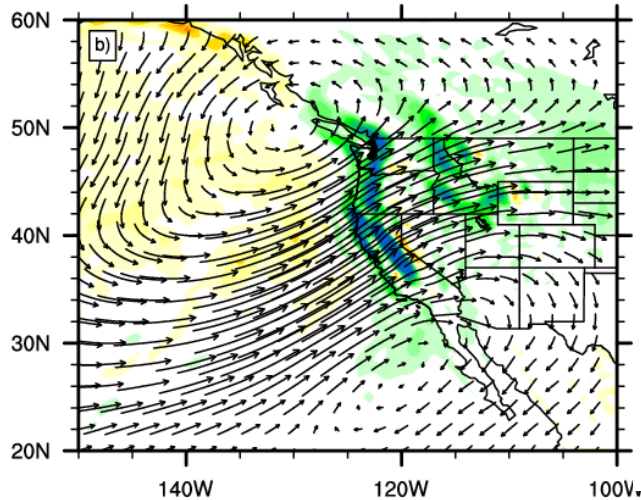
## Leading Mode of Moisture Transport over Western North America



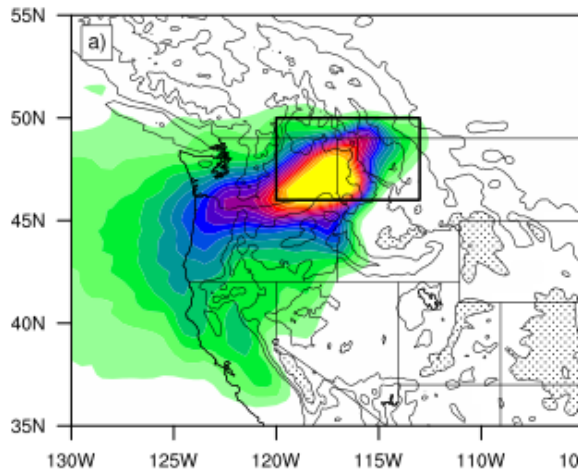
=> *What are the paths of moisture leading to extreme precipitation over the Western United States?*



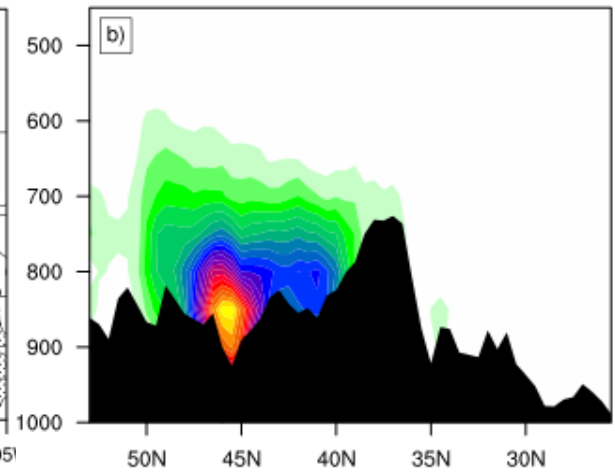
Leading Mode of Moisture Transport over Western North America



Track Density of Moisture Paths Leading to Extreme Precipitation over eastern Washington



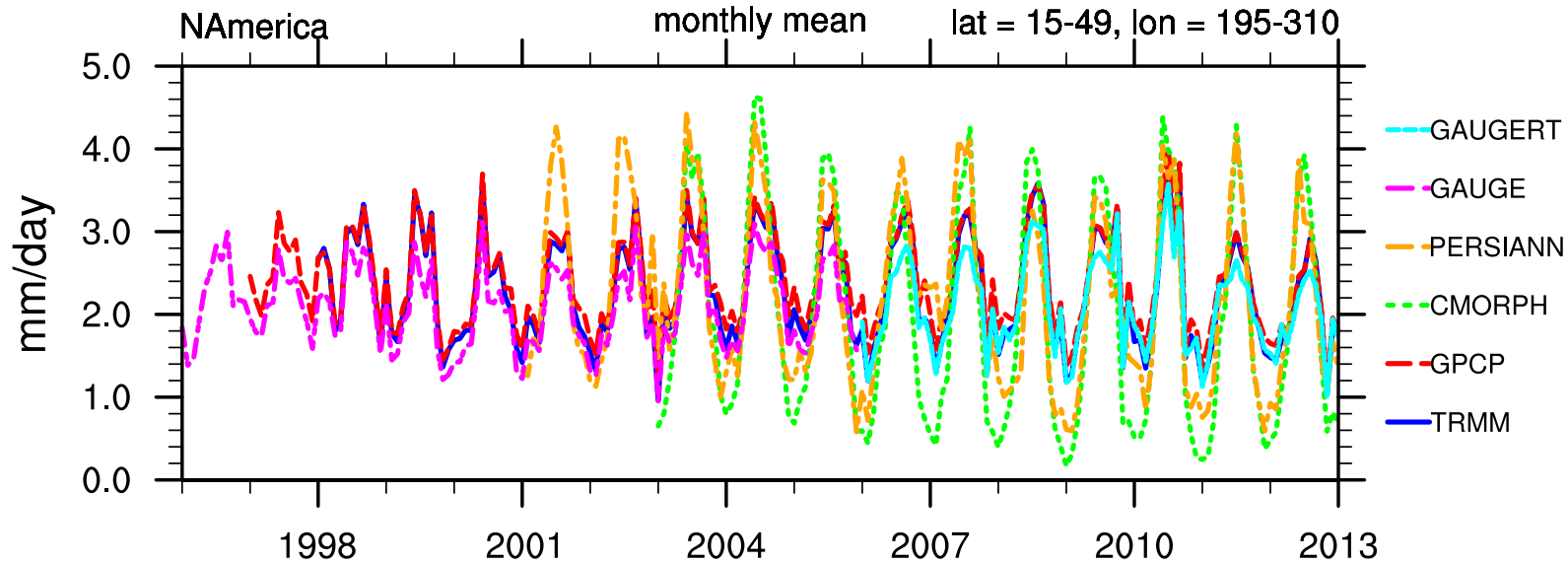
Vertical Section of Moisture Path Leading to Extreme Precipitation over eastern Washington



=> *What are the paths of moisture leading to extreme precipitation over the Western United States?*



## Comparison of Precipitation Data Sets over North America

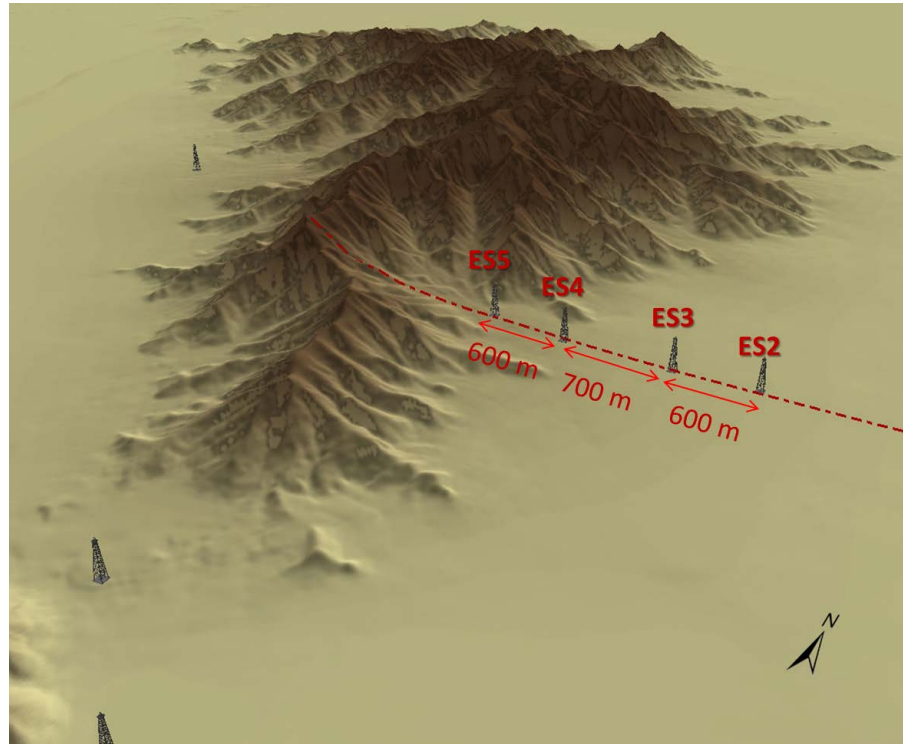


=> *Addresses a fundamental Climate Issue: How Much Does it Actually Rain?  
Critical for Global Moisture Budgets and for Model Validation*



# Upcoming Talks....

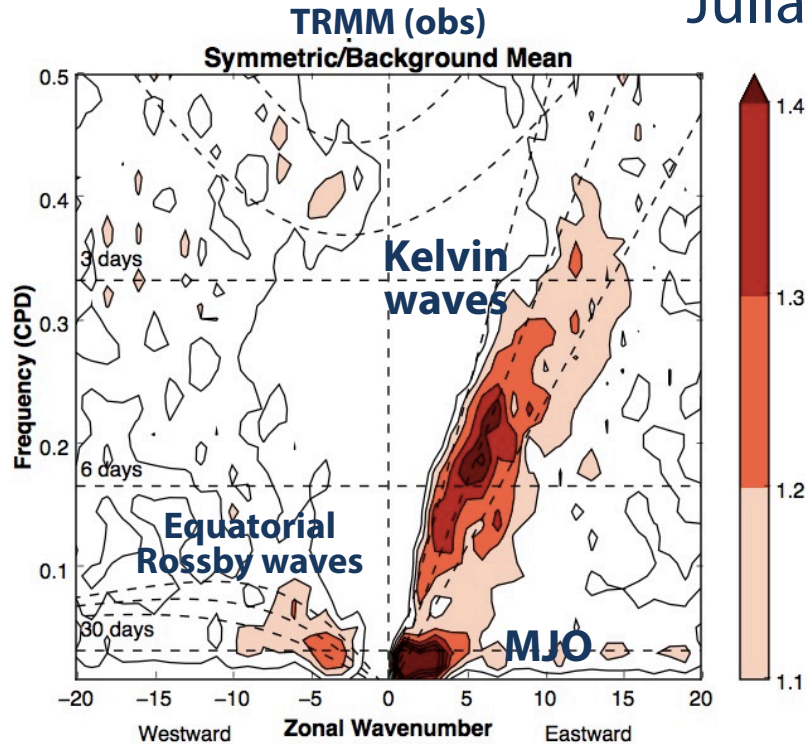
## Stable Boundary Layers- Andrey Grachev



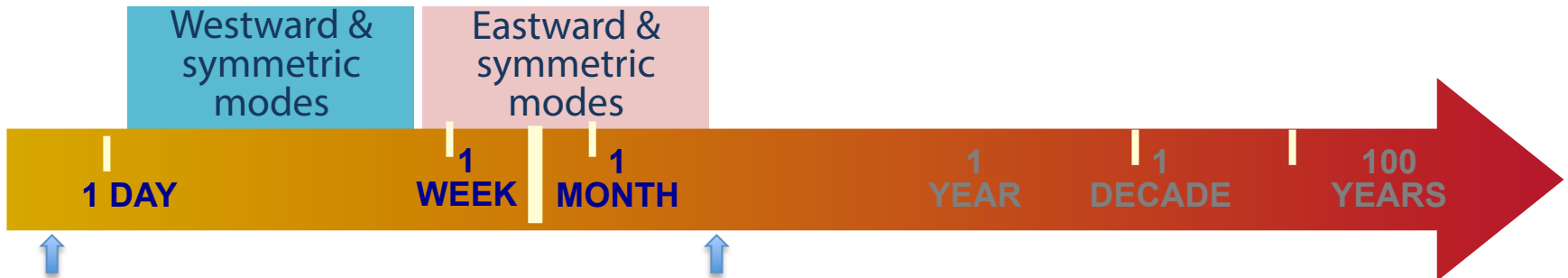
*Do We Understand  
Turbulent Fluxes over  
Stable Boundary  
Layers?*



# Understanding Convective Coupling in Atmospheric Tropical Waves- Juliana Dias

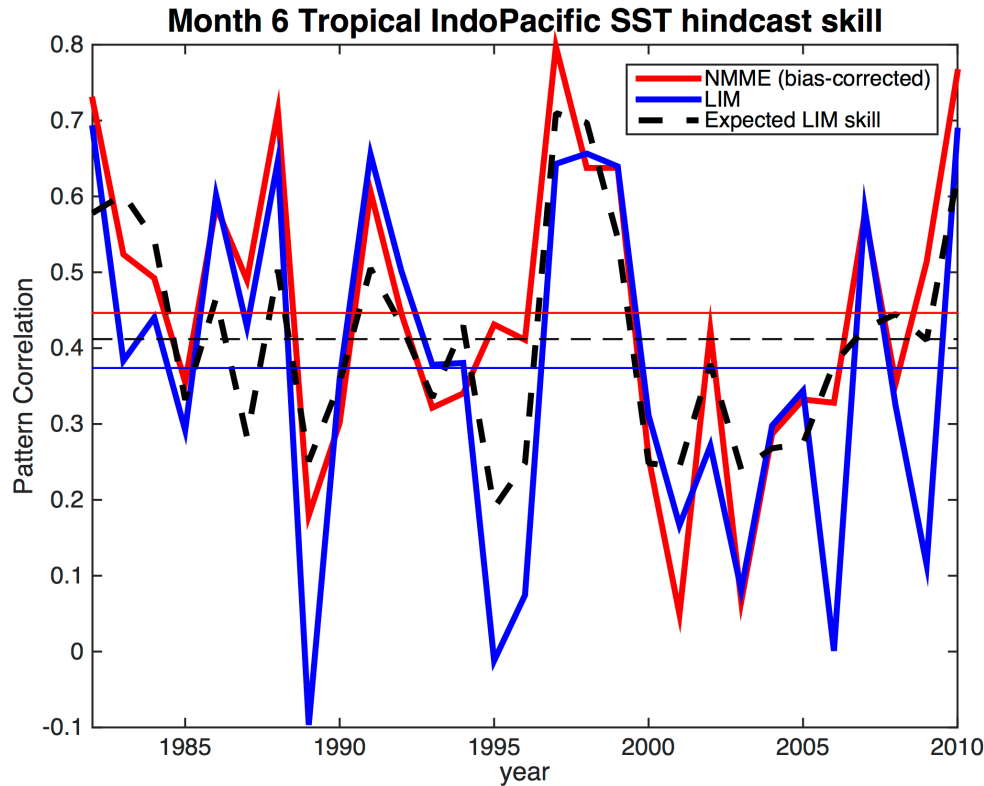


*How well do models reproduce equatorial waves?*



# Tropical Forecasts and Predictability for Week 3 and Beyond-

## Matt Newman

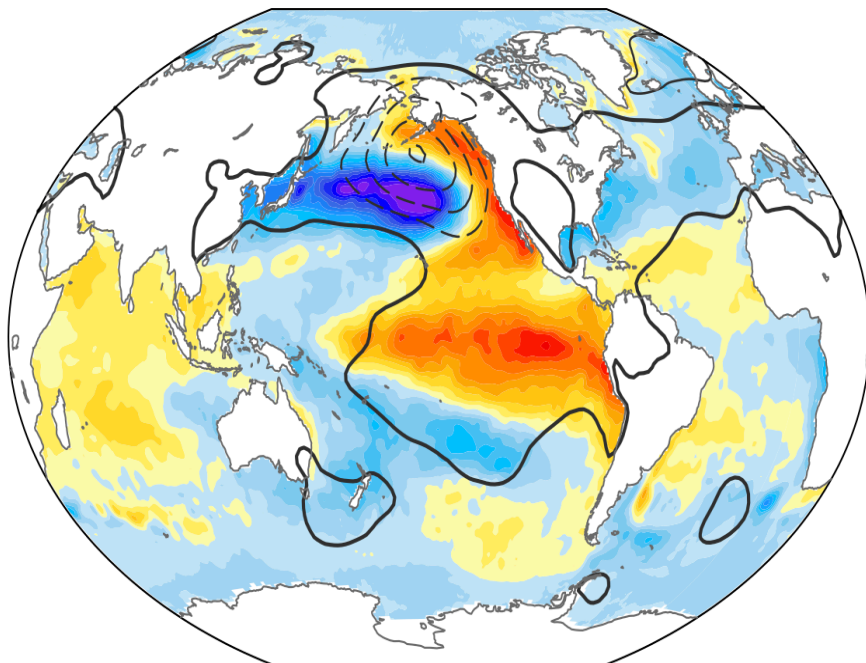


*Can we characterize predictability beyond week 2?*



# The Processes Underlying the Pacific Decadal Oscillation

## Mike Alexander



*What are the processes underlying the PDO?*

