

# Sunspot Cycles and the Drought of 2001



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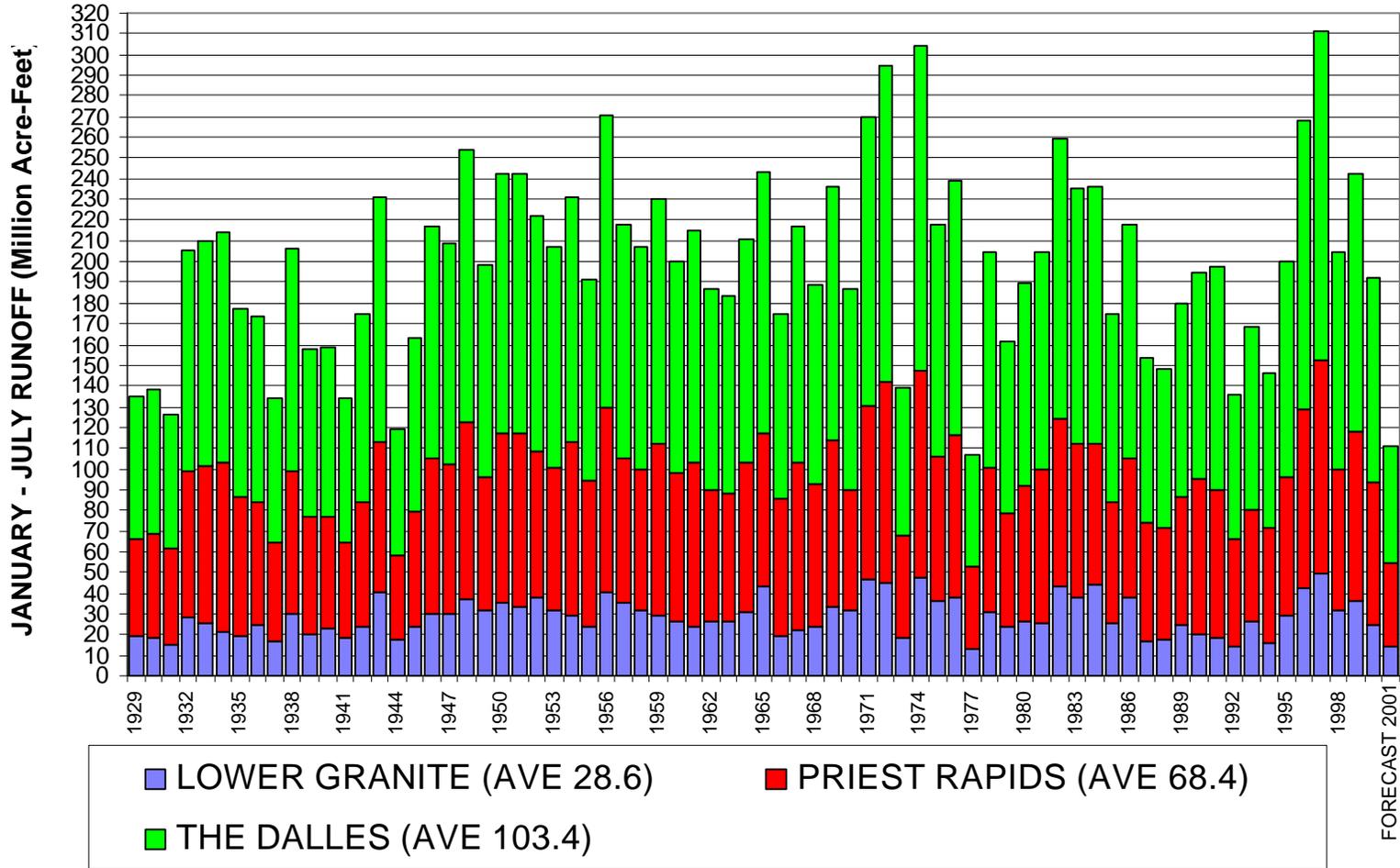
Portland, Oregon

# The Drought of 2001



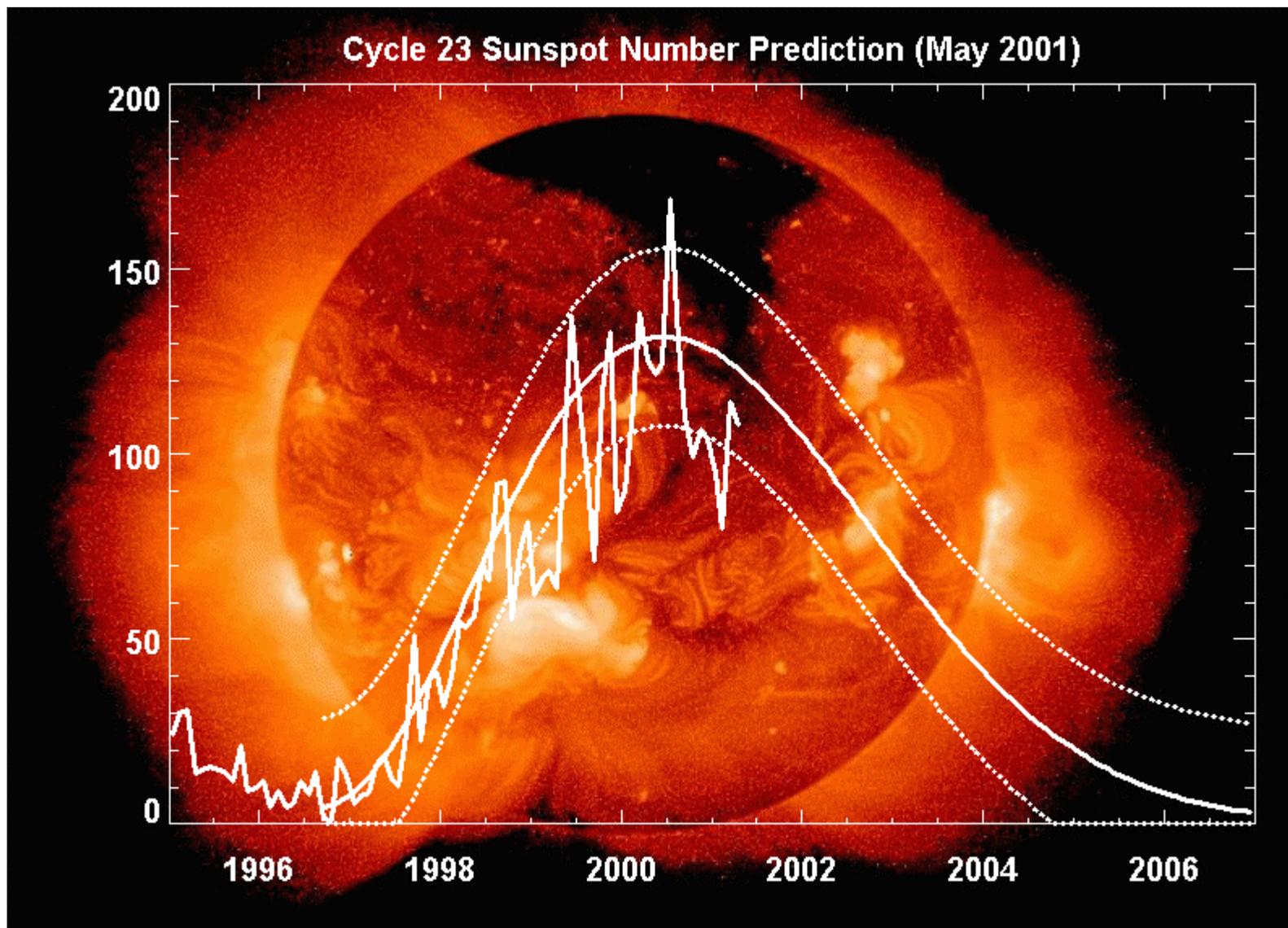
- The drought began in November 2000. PNW seasonal precipitation totals have averaged 40% to 90% of normal since October 1st, 2000.
- Federal managers at the TMT were advised on the drought (1-10-2001), but ignored CRITFC's input. NOAA's NCEP keeps insisting "near normal" precipitation in their climate forecasts, despite being wrong since November 2000.
- Winter reservoir levels were 10-35 feet lower than in 1977, the worst drought in 70 years.

## RUNOFF AT LOWER GRANITE, PRIEST RAPIDS & THE DALLES



# Possible Cause of the Drought

- New research suggests that sunspot cycles can cause short-term variation in solar radiation reaching the Earth, and trigger *El Nino* events.
- Dr. Landscheidt of Nova Scotia predicted, using sunspot cycle analysis in 1998, that the next *El Nino* could peak in September 2002. His paper, "Solar Activity Controls El Nino and La Nina" : <http://www.microtech.com.au/daly/sun-enso/sun-enso.htm>



([www.SunspotCycle.com](http://www.SunspotCycle.com))

Sunspot correlations with *El Nino* events

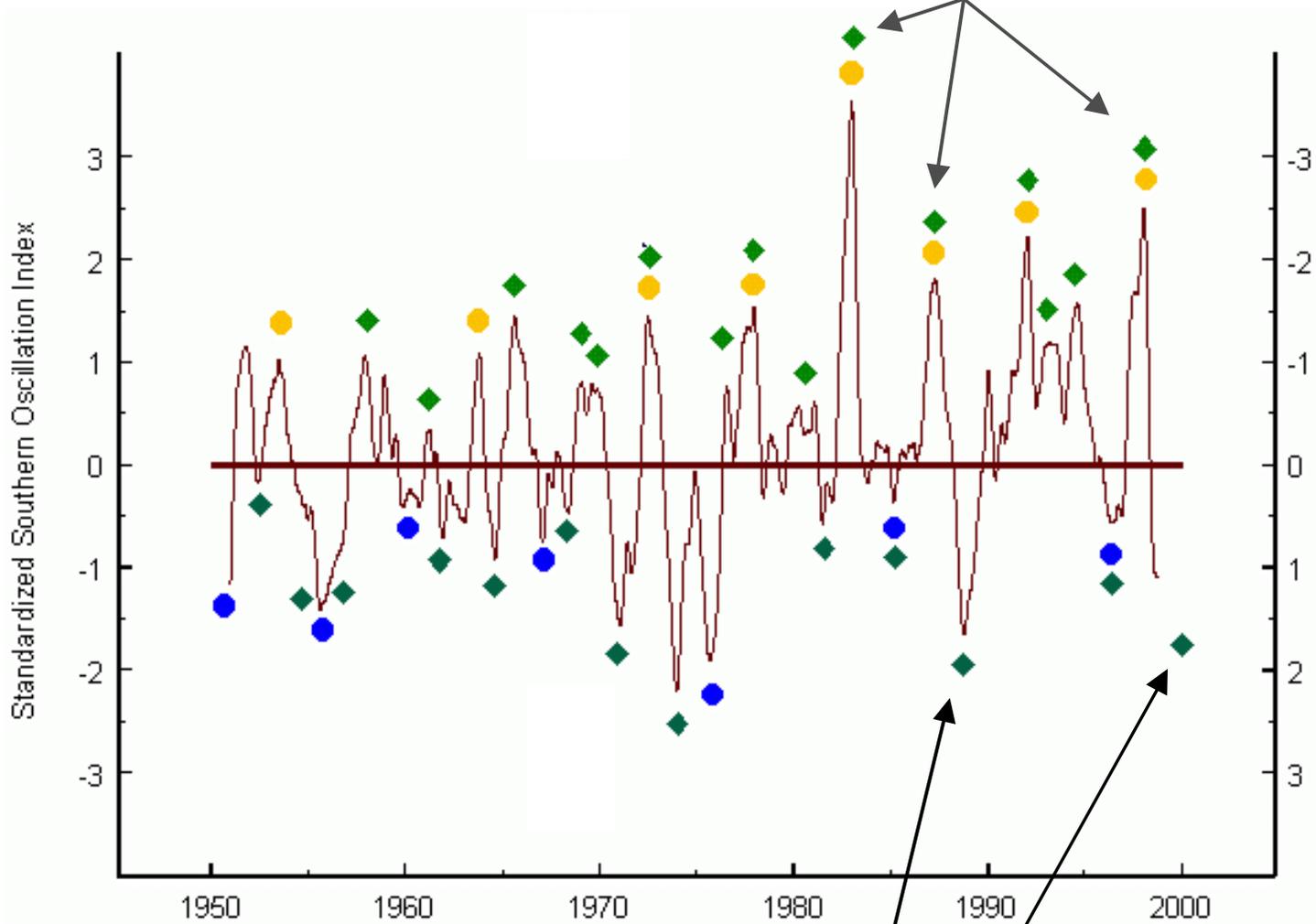
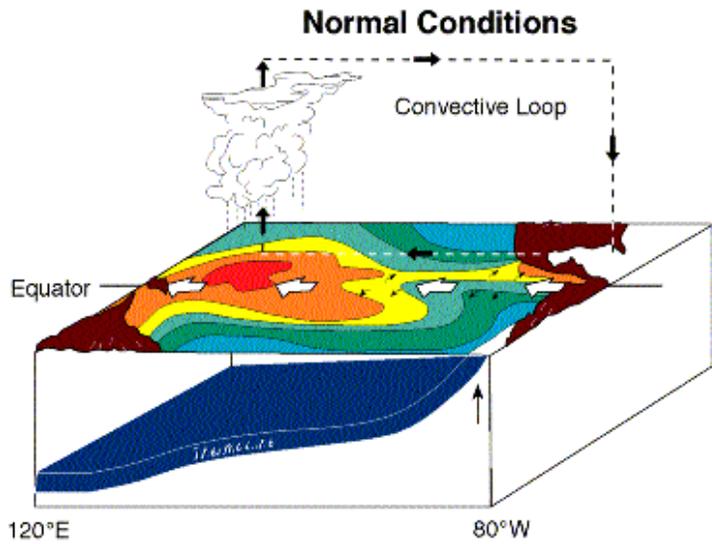


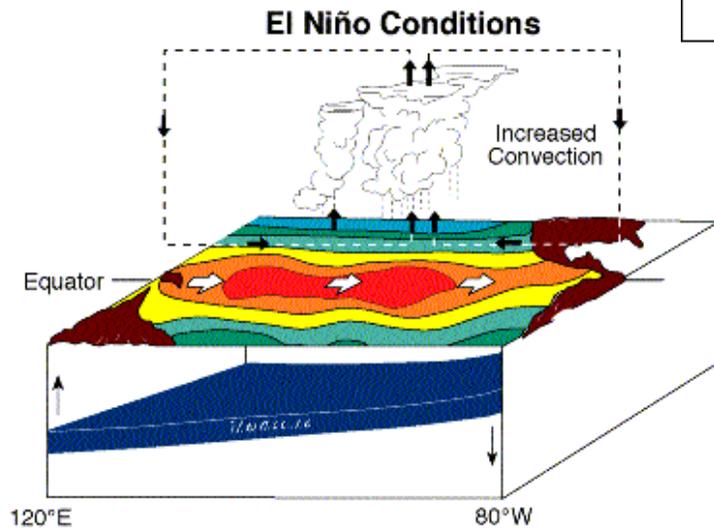
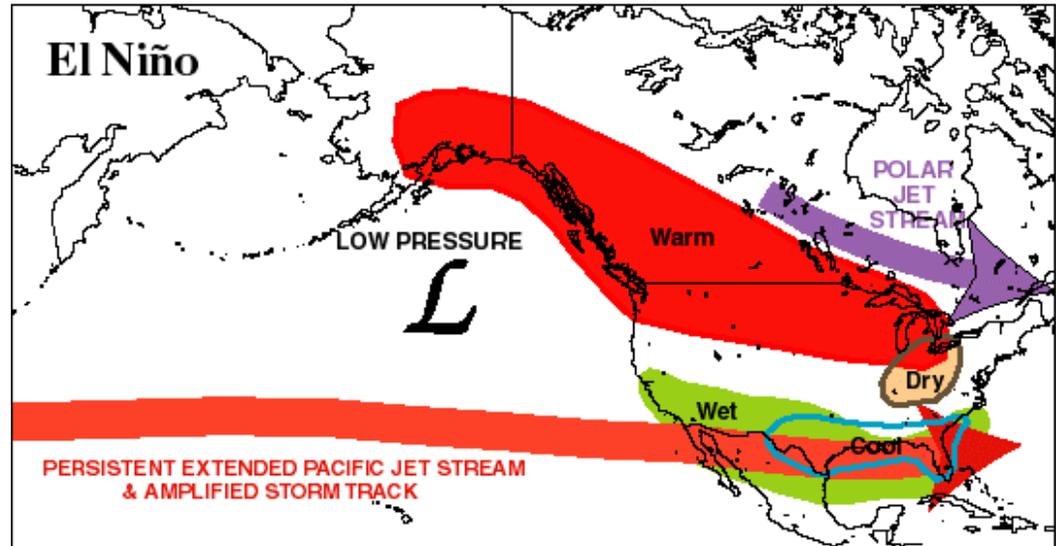
Figure 8

(from Landscheidt, 1998)

Sunspot correlations with *La Nina* events



**TYPICAL JANUARY-MARCH WEATHER ANOMALIES AND ATMOSPHERIC CIRCULATION DURING MODERATE TO STRONG EL NIÑO & LA NIÑA**



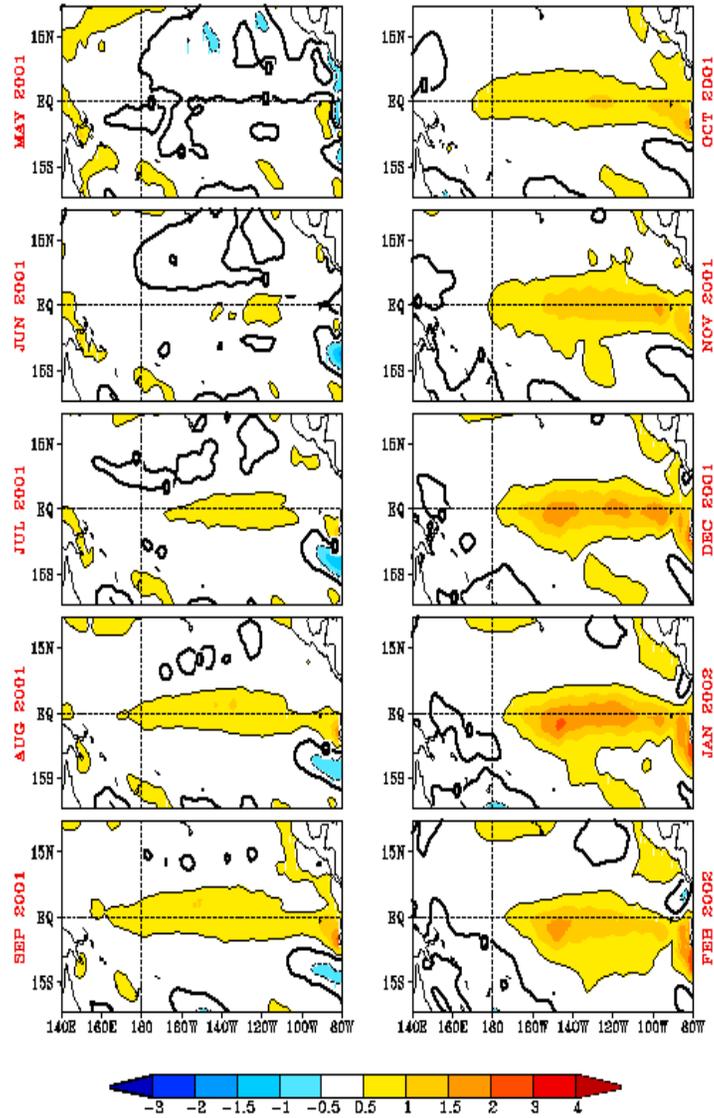
NOAA/PMEL/TAO

<http://www.pmel.noaa.gov/toga-tao/el-nino/nino-home.html>

# Is *El Nino* coming?

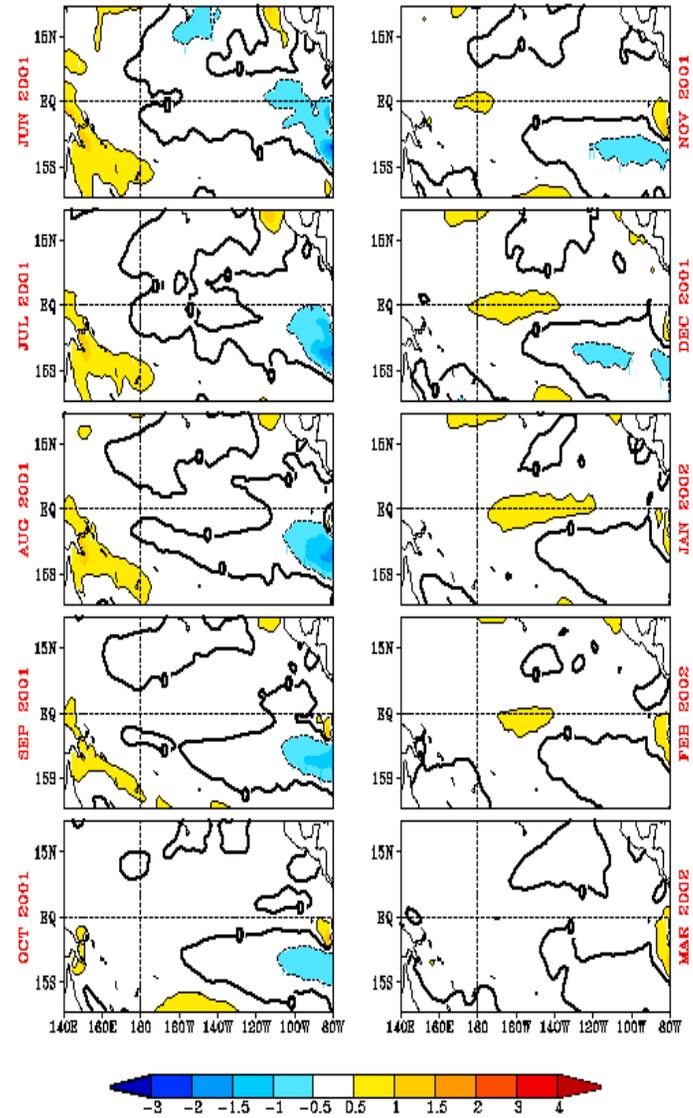
- A split jet stream persisted last winter. This *El Nino* like sign was not ocean related?
- Sunspot maxima usually occur 1-3 years before the peak of an *El Nino*. March 2000 was the last peak of sunspot maxima.
- NOAA climate forecasts suggest the Pacific Ocean will stay "near normal" this winter.
- Pattern follows 1992-1994: Dry-Normal-Dry (*El Nino*) and coincides with last solar peak.

**FORECAST SST ANOMALIES**



Last Update: Tue May 1 2001

**FORECAST SST ANOMALIES**



Last Update: Tue Jun 5 2001

# Compare Climate Forecasts

PRECIP	NOV	DEC	JAN	FEB	MAR	APR	MAY
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NCEP	Avg	Avg	Wet	Wet	Avg	Avg	Wet
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CRITFC	Wet	Dry	Dry	Dry	Dry	Dry	Dry
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Observed	DRY	DRY	DRY	DRY	DRY	WET	DRY
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TEMP	NOV	DEC	JAN	FEB	MAR	APR	MAY
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NCEP	Avg	Avg	Avg	Cold	Avg	Avg	Warm
------	-----	-----	-----	------	-----	-----	------

CRITFC	Cold	Cold	Avg	Warm	Cold	Avg	Avg
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Observed	COLD	COLD	AVG	COLD	AVG	COLD	WARM
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# Impacts to PNW rivers and salmon

- Expect persistent dryness through October. Precipitation will be 60 - 70% of normal.
- Water Year 2002 will be 80-90% normal precip, then transition into a dry *El Nino* in 2002-2003.
- Regional power needs have driven reservoir levels down to unprecedented lows. Low flows will favor high summer hydropower peaking.
- CRITFC advocates using water now to assist record number of returning salmon adults, knowing that reservoir levels will be impacted. Winter rain in 2001-02 will help regional refill.

# Summary



- Sunspot maxima occur 1-3 years before an *El Nino* event. Droughts may occur then.
- Solar cycle analyses could help Federal managers better utilize Columbia basin water resources on a 1-2 year scale.
- Sea-surface temperature forecasts suggest a "near normal" winter for 2001-2002.
- Expect precipitation to be 60-70% of normal through October, then 80-90% of normal in the winter 2001-2002. Analogy: 1992-1993.