DIRECCIÓN METEOROLÓGICA DE CHILE

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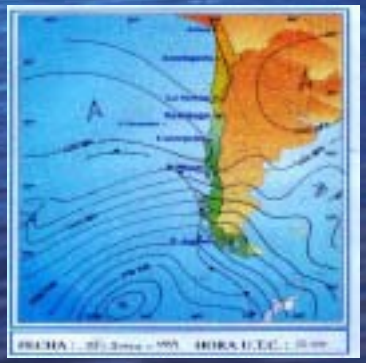
STATUS AND USE OF CLIMATE PREDICTIONS IN THE CHILEAN WEATHER SERVICE

APCN Meeting, Republic of Korea, Busan, 9-12 NOV 2004



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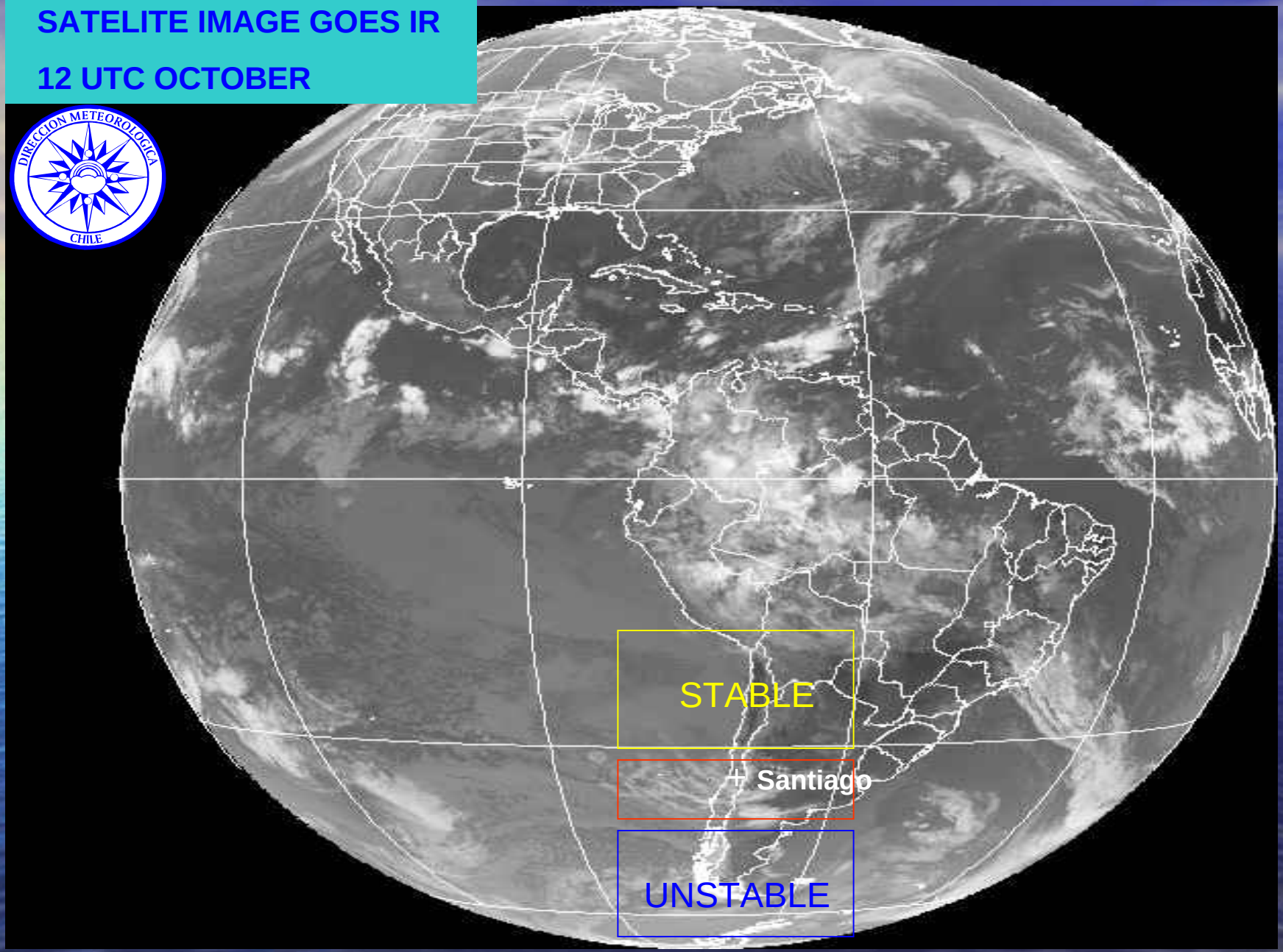
TOPICS

- INTRODUCTION
- ENSO & PRECIPITACION IN CHILE
- SEASONAL PREDICTION METHODOLOGY
- REMARKS

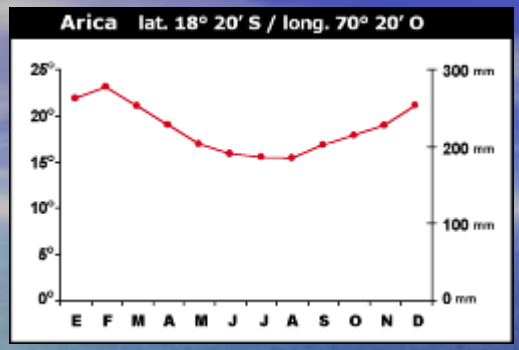
SATELITE IMAGE GOES IR

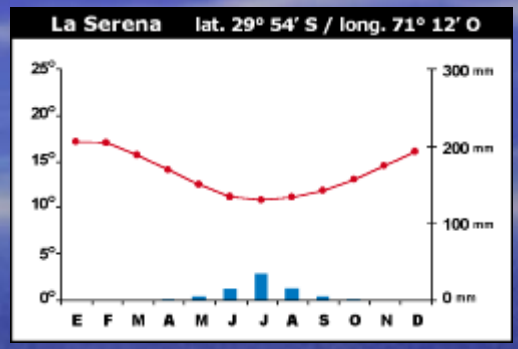
12 UTC OCTOBER



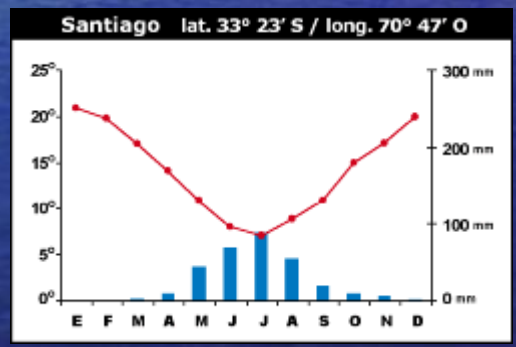
PRECIPITATION & TEMPERATURE BEHAVIOR

NORTH

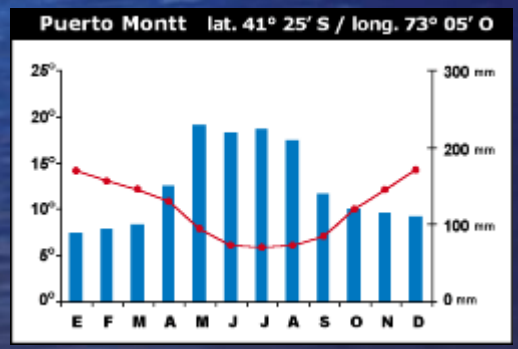


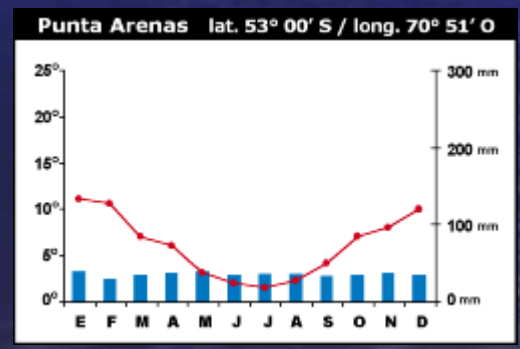


CENTRAL



SOUTH





ENSO & Precipitation in Chile

- The studies have shown a good relation between El Niño and years with above-normal annual precipitation in central and southern Chile.

- In the other hand, most La Niña years correlate with below normal precipitation.

EL NIÑO

1902	505.9
1905	615.9
1911	170.0
1914	700.5
1918	376.8
1925	258.6
1929	354.2
1939	322.6
1941	671.9
1953	583.0
1957	310.4
1965	413.4
1972	573.0
1976	200.5
1982	623.4
1986	311.3
1992	464.0
1997	709.3

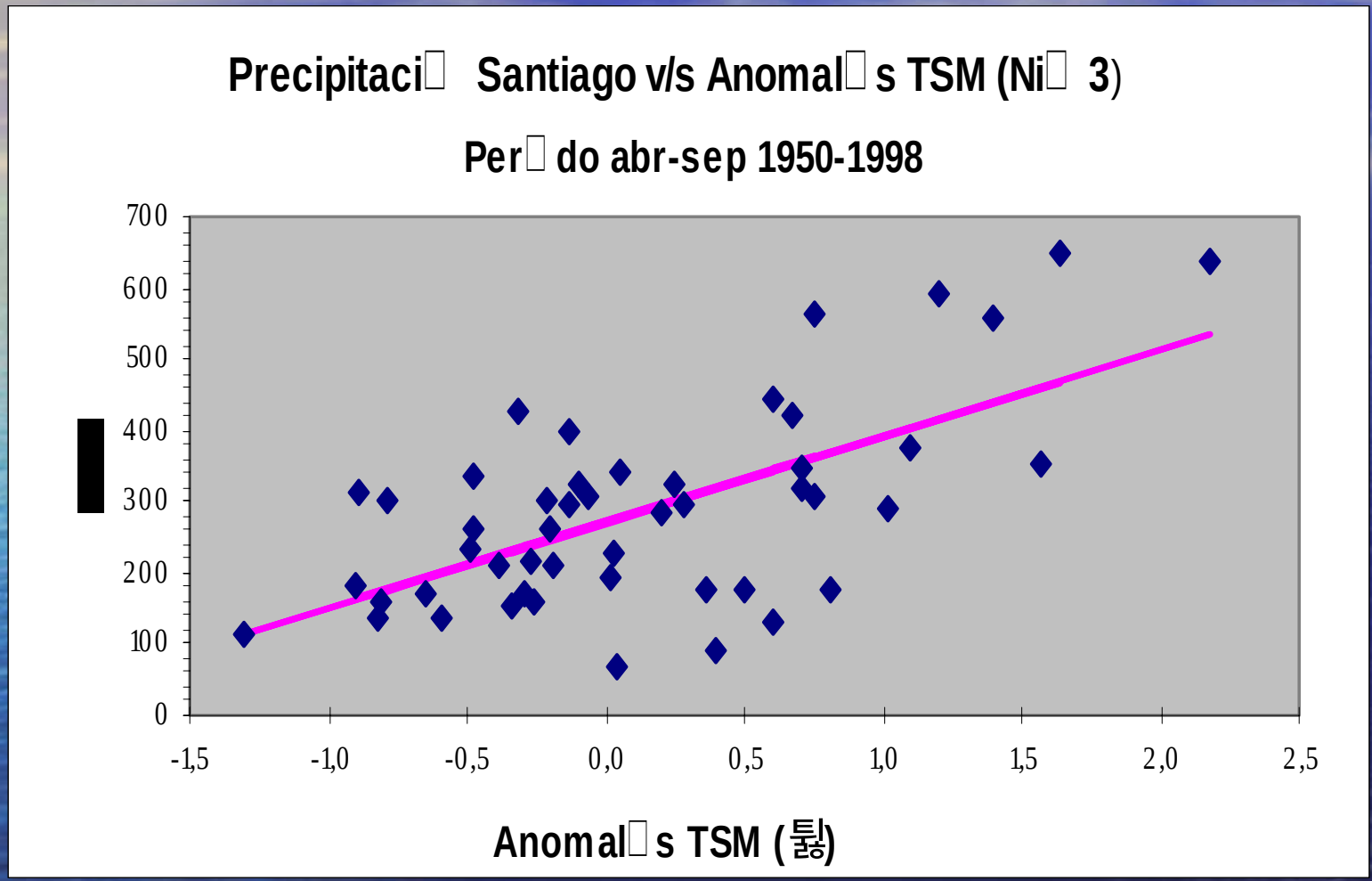
Normal pp

SANTIAGO

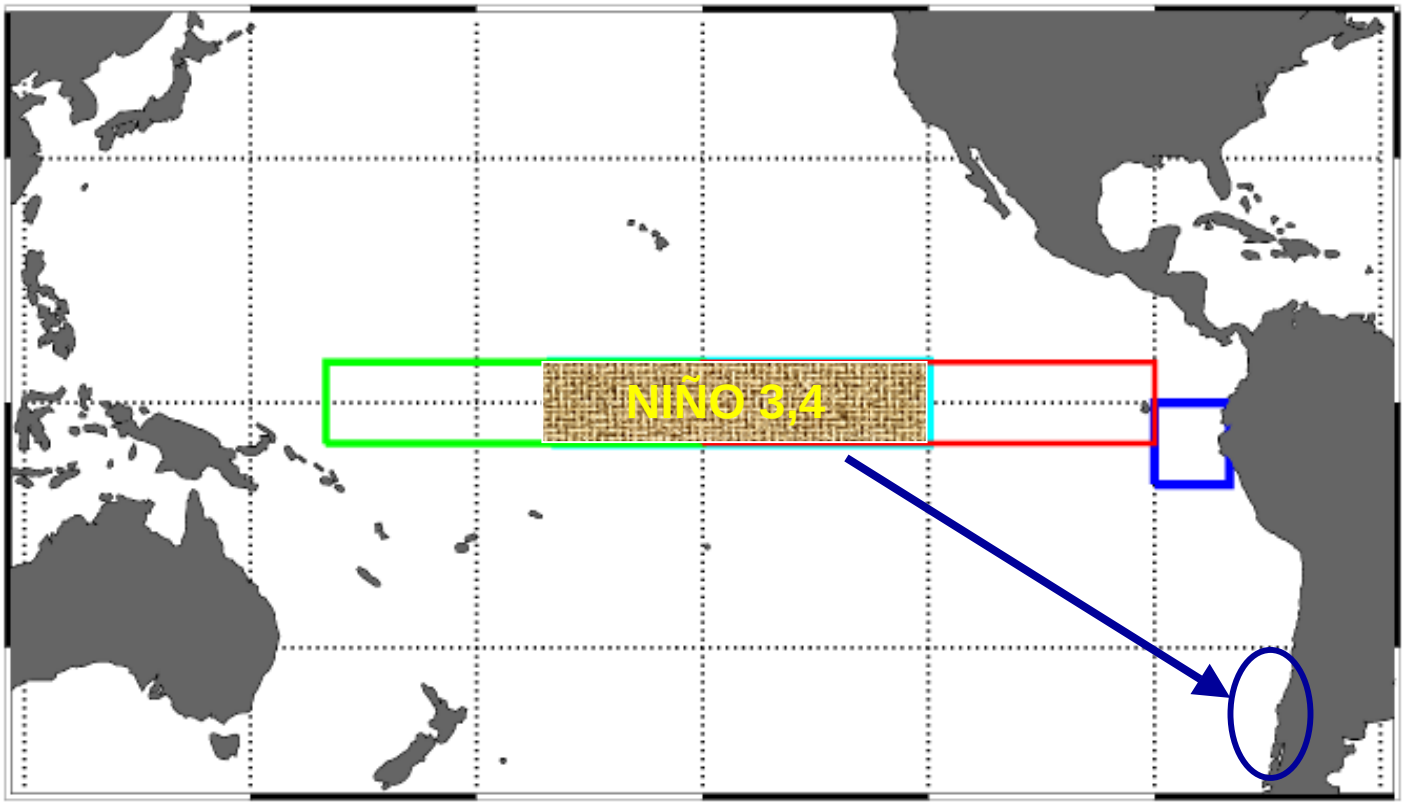
312.5 mm

1904	687.0
1908	202.0
1910	270.0
1916	225.3
1924	66.3
1928	340.6
1938	202.0
1950	292.7
1955	193.8
1964	186.4
1970	327.7
1973	172.1
1975	184.3
1988	139.6
1995	172.5
1998	89.3

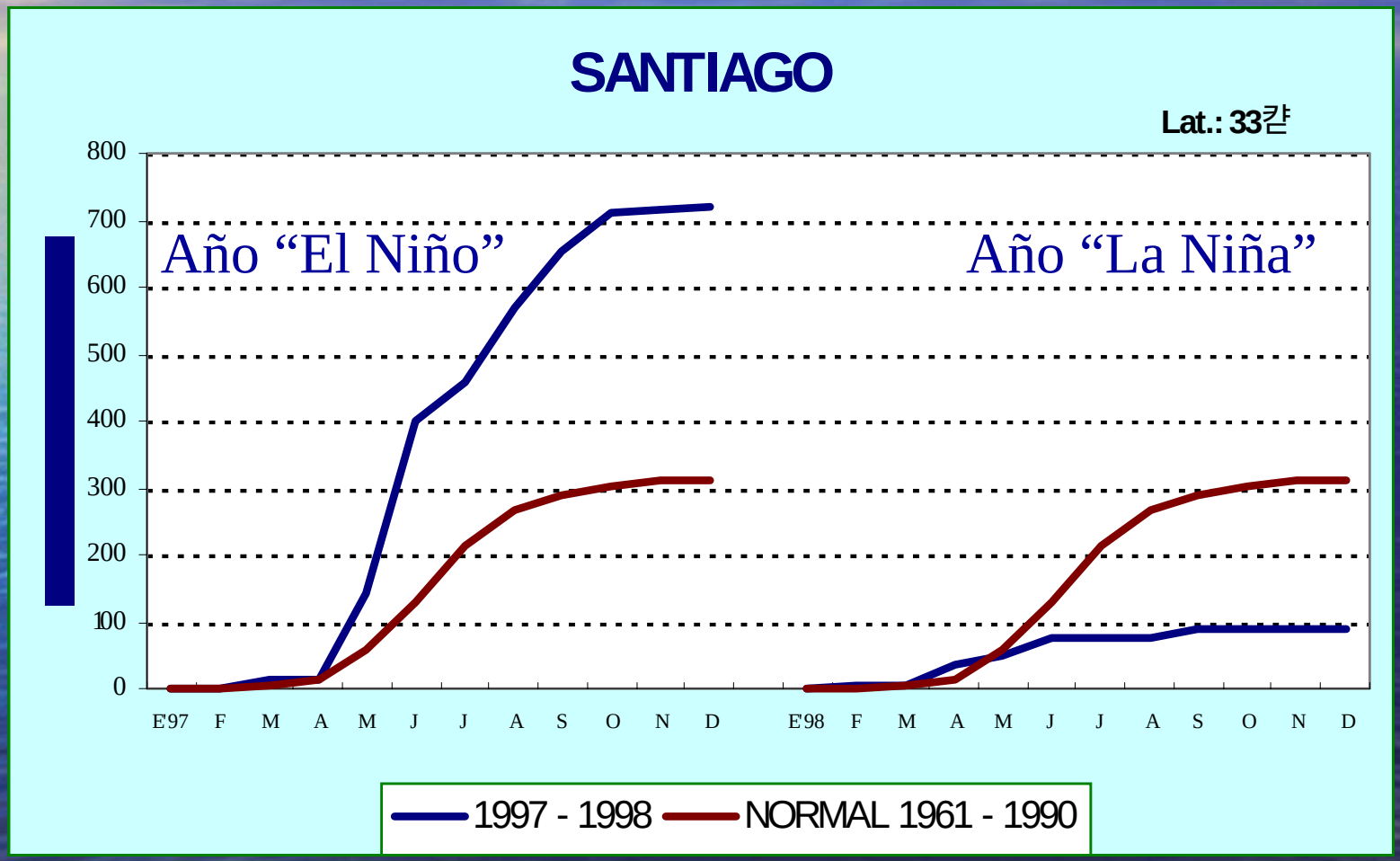
LA NIÑA


Precipitaci Santiago v/s Anomal s TSM (Ni 3)
Per do abr-sep 1950-1998
700
600
500
400
300
200
100
0
-1,5
-1,0
-0,5
0,0
0,5
1,0
1,5
2,0
2,5
Anomal s TSM (

Nino3.4, Lon = [-170, -120], Lat = [-5, 5]
Nino12, Lon = [-90, -80], Lat = [-10, 0]
Nino4, Lon = [160, -150], Lat = [-5, 5]
Nino3, Lon = [-150, -90], Lat = [-5, 5]



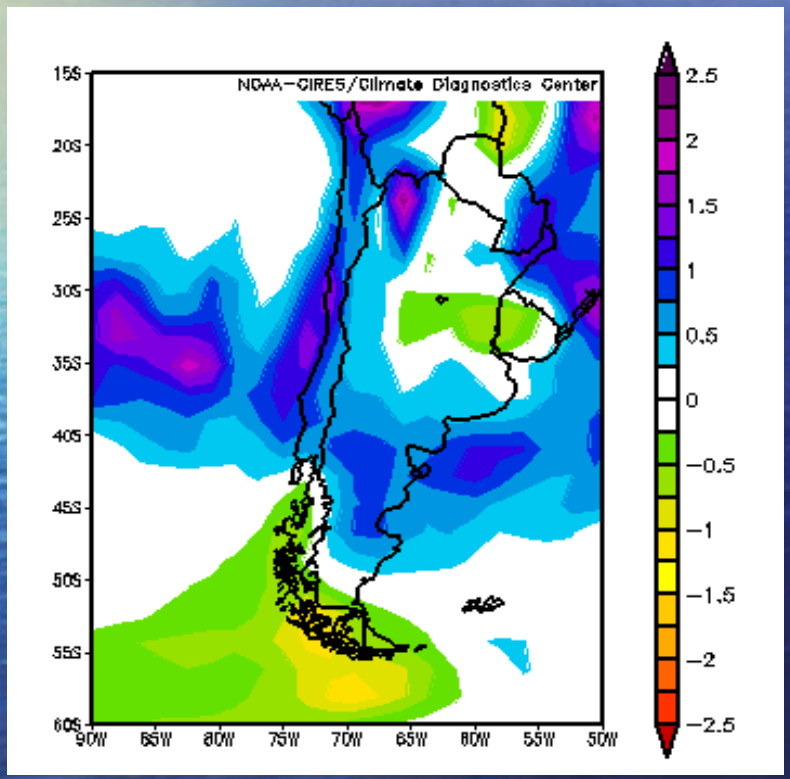
Precipitation



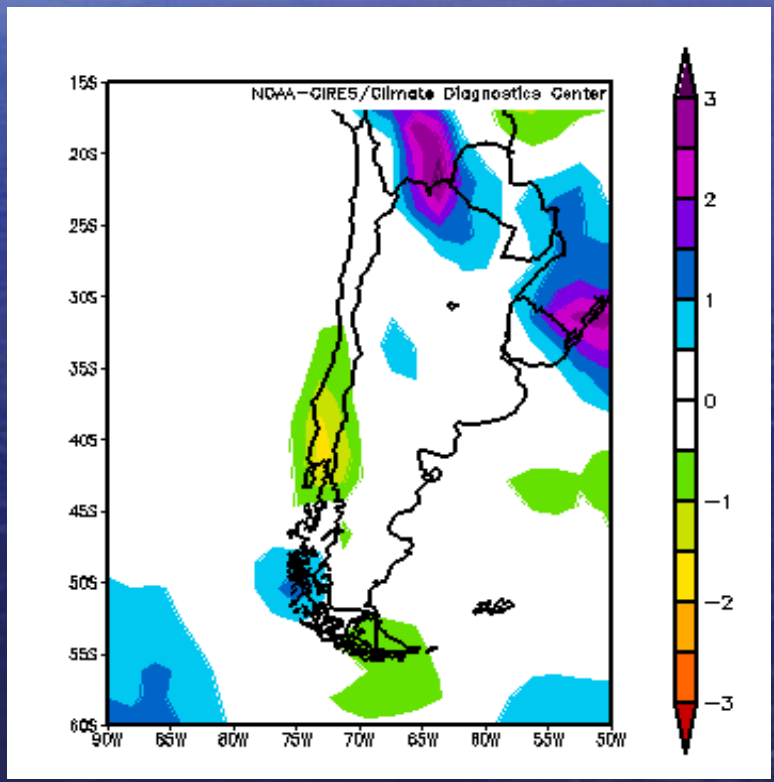
V.- Efects in Chile

Precipitation anomalies

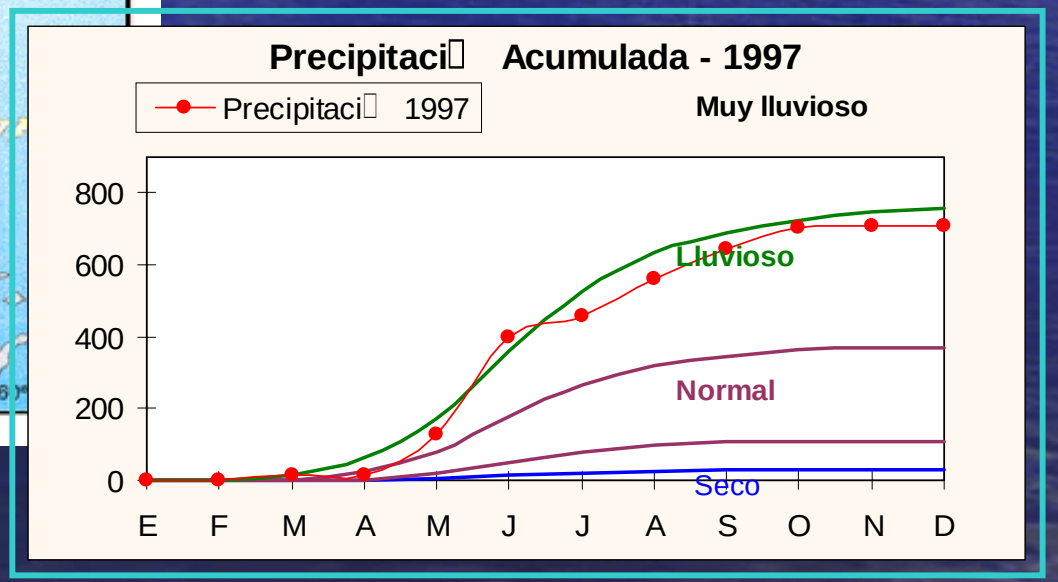
1997



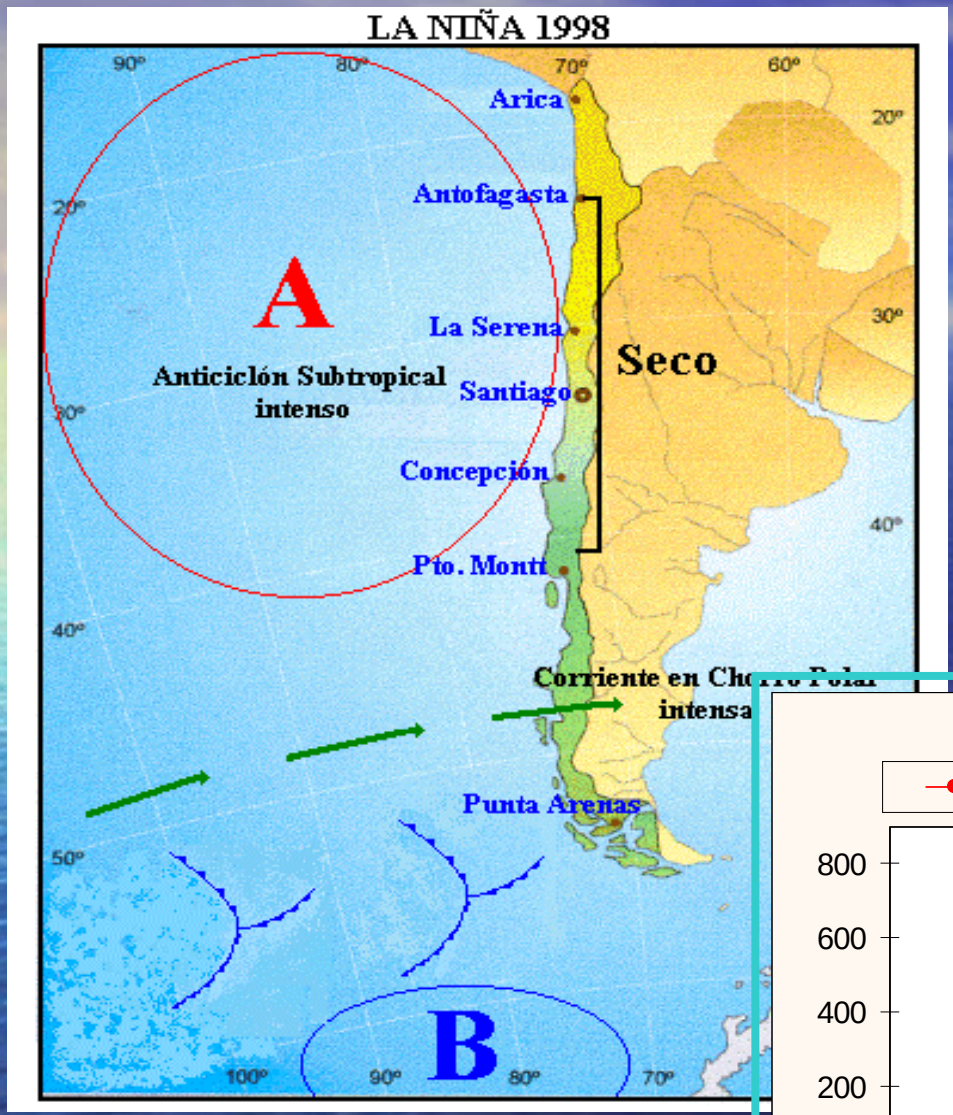
1998

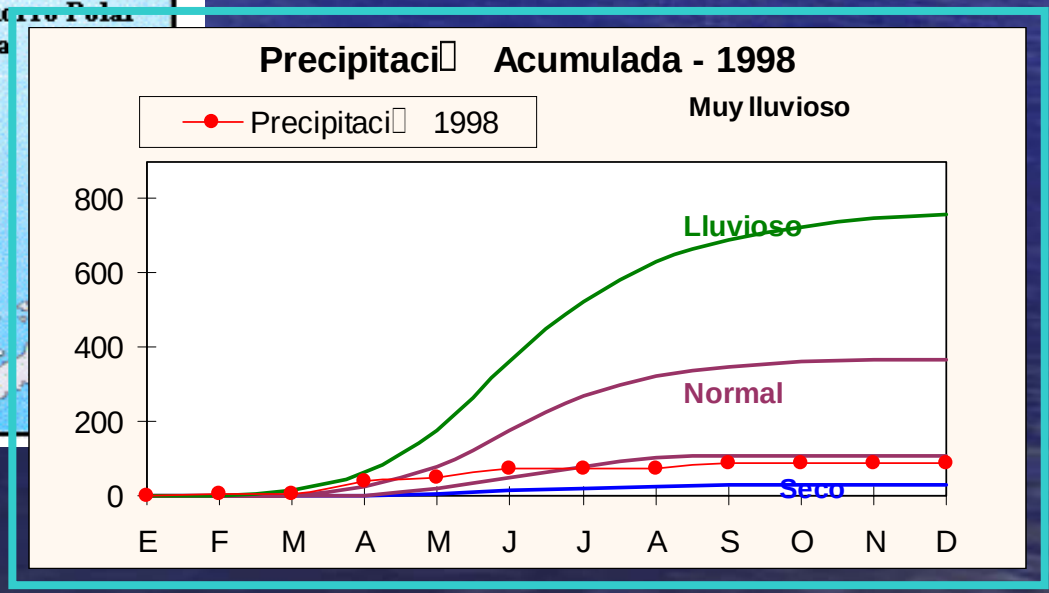



EL NIÑO 1997 - 1998
A
Anticiclón Subtropical débil
Arica
Antofagasta
La Serena
Corriente en Chorro Subtropical intensa.
Santiago
LLuvioso (mayo 97 - nov. 97) y Cálido (mayo 97 - abril 98)
Concepción
Incremento de frecuencia de sistemas frontales en invierno y primavera 1997
Pto. Montt
A
Alta de Bloqueo intensa
Punta Arenas

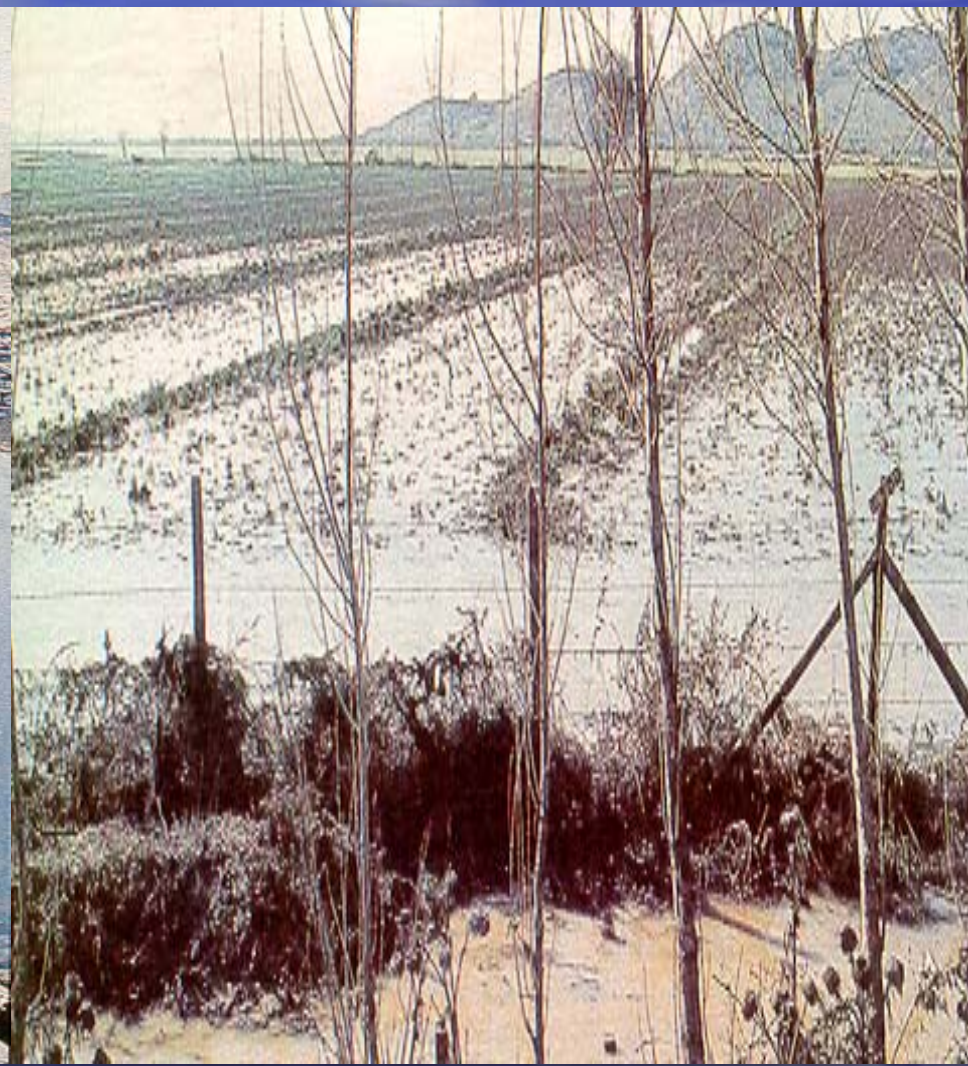

Precipitaci Acumulada - 1997
Precipitaci 1997
Muy lluvioso
800
600
400
200
0
Lluvioso
Normal
Seco
E F M A M J J A S O N D

IMPACT : RAINY YEARS


LA NIÑA 1998
Arica
Antofagasta
La Serena
Santiago
Concepción
Pto. Monti
A
Anticiclón Subtropical intenso
Seco
Corriente en Ch
intensa
Punta Arenas
B
90°
80°
70°
60°
20°
30°
40°
50°
100°


Precipitaci Acumulada - 1998
Precipitaci 1998
Muy lluvioso
Lluvioso
Normal
Seco
800
600
400
200
0
E
F
M
A
M
J
J
A
S
O
N
D

IMPACT : DRY YEARS



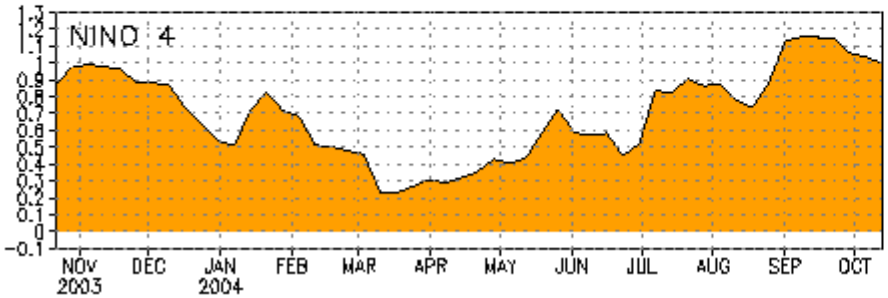
SEASONAL PREDICTION IN THE CHILEAN WEATHER SERVICE

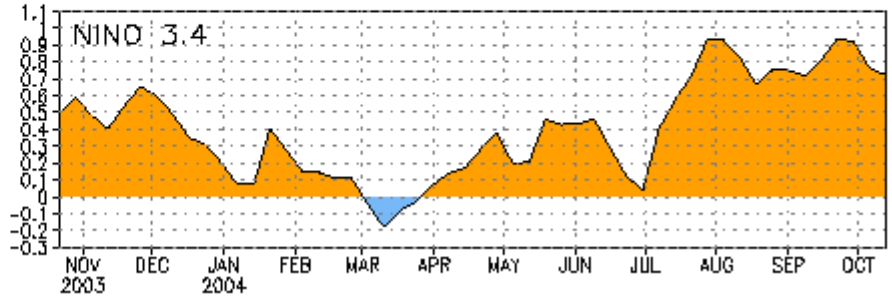
- In 2002 began the experimental use of a methodology based in statistical techniques. This uses a software to compute a Contingence Table and a quartiles theory
- The methodology is applied in the central and the southern part of Chile, between 18º and 53 ºS (9 stations as reference)
- The predictors variables are monthly climate indices
- The product is a three month seasonal forecast of precipitation

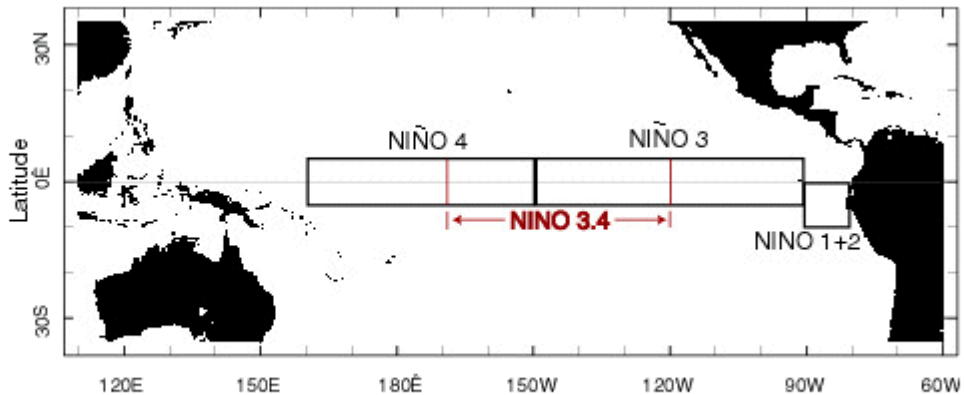
METHOD DESCRIPTION

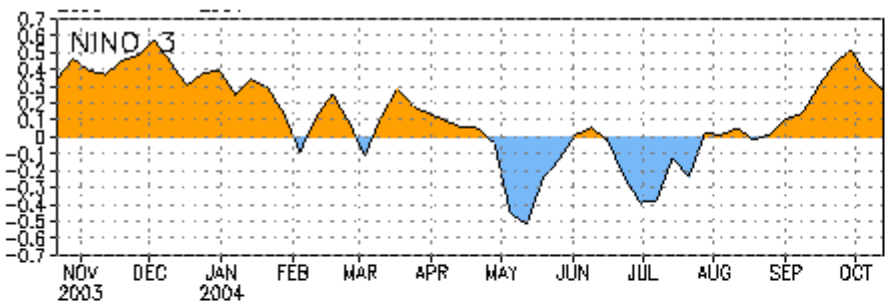
- Evolution of the SST anomaly for Niño region 3.4 is determined ,for next three months
- Areas where there are a good correlation between SST Niño 3.4 and precipitation are identified
- A database is done for monthly data of precipitation between1950 and 2003
- The probability of finding a precipitation condition of below,normal or above normal is calculated using the Contingence Table
- Values of precipitation quartiles are computed

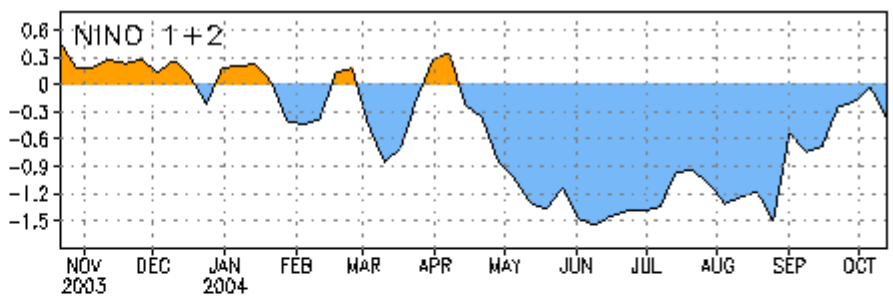
ANOMALÍAS DE TEMPERATURA SUPERFICIAL DEL MAR (°C)











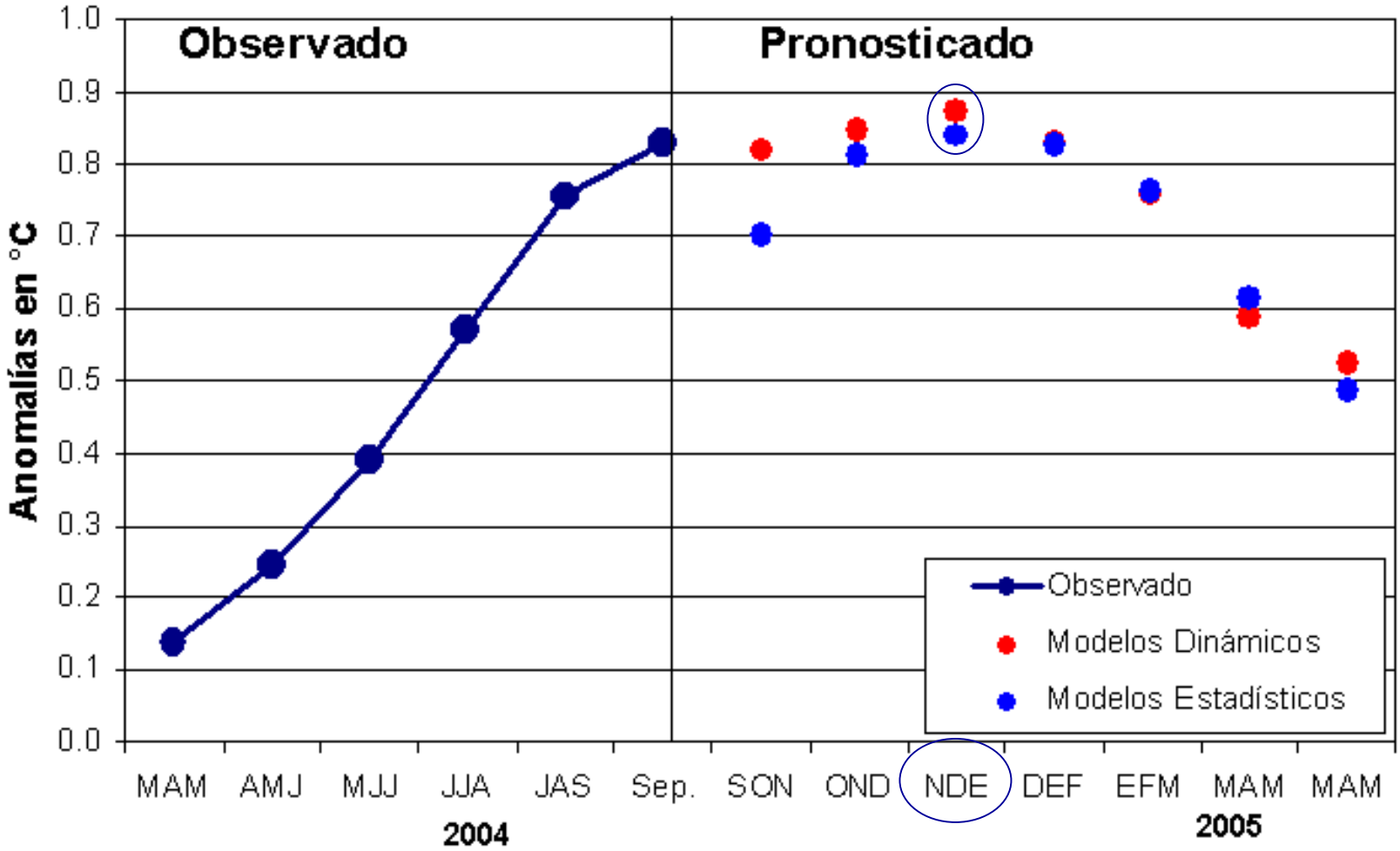
Datos actualizados al 13 de Octubre 2004

Fuente: Centro de Predicción Climática (NOAA-EE.UU.)

Anomalía Positiva (Calentamiento)

Anomalía Negativa (Enfriamiento)

Región del Niño 3.4



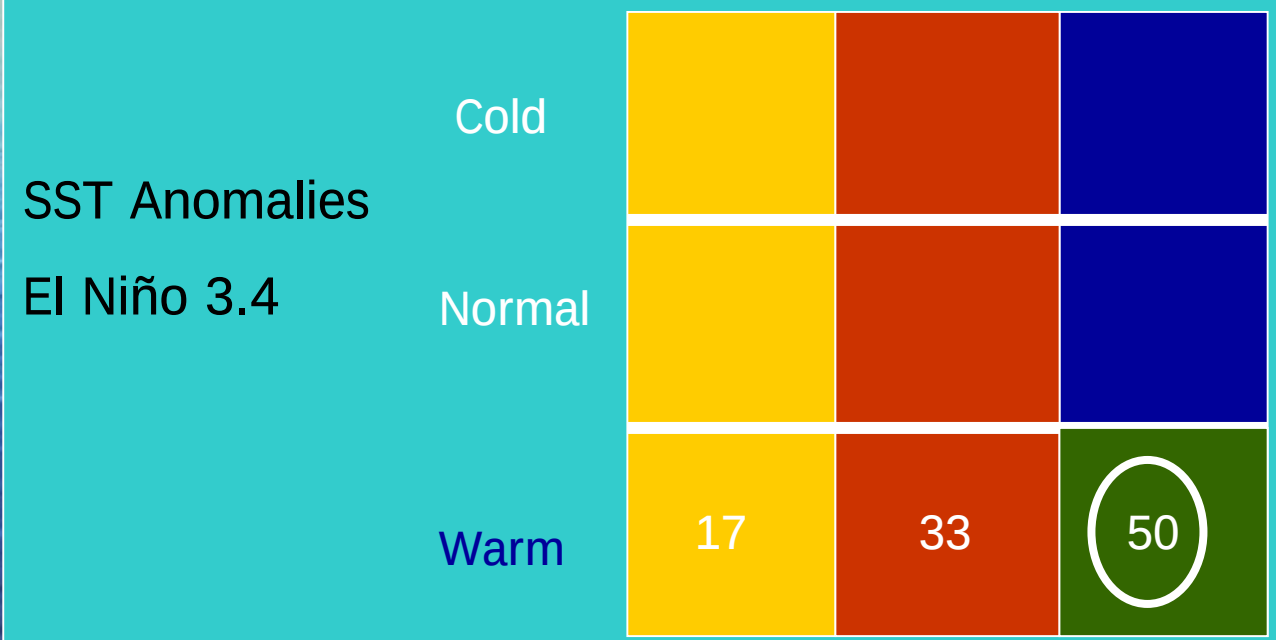
Fuente: Datos obtenidos del International Research Institute for Climate Prediction (IRI) - EE.UU.

Table of Contingence

Example

SANTIAGO N-D-J

% Prob. Rainfall



SST Anomalies

El Niño 3.4

PRONOSTICO ESTADISTICO

Probabilidades esperadas en la precipitación en Chile

Trimestre: Noviembre-Diciembre 2004 - Enero 2005

Ciudades	Seco	Normal	Lluvioso
La Serena (1)	39	11	50
Santiago (2)	17	33	50
Curicó (3)	17	33	50
Concepción (4)	17	27	56
Temuco (5)	17	39	44
Valdivia (6)	17	39	44
Pto. Montt (7)	33	39	28
Coyhaique (8)	33	28	39
Pta Arenas (9)	17	33	50

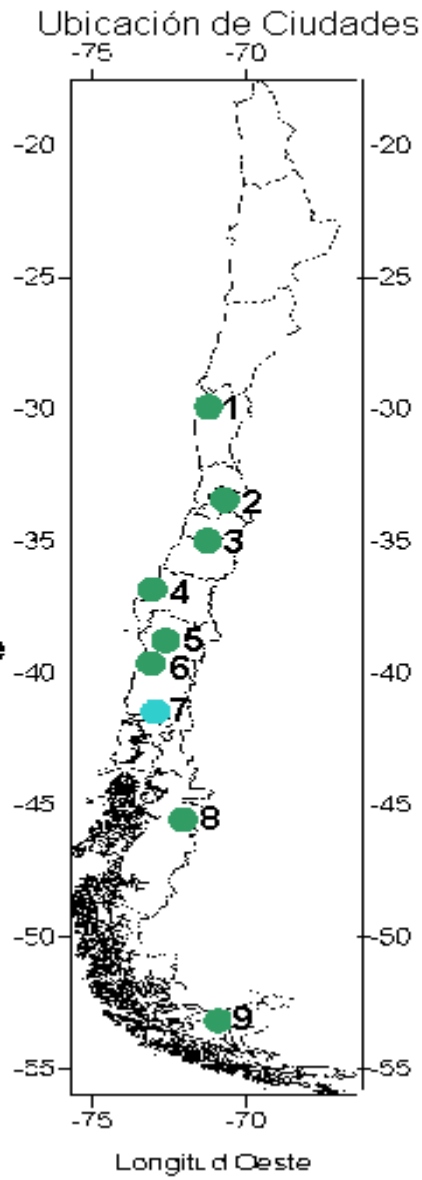
CONDICIÓN CLIMATOLÓGICA

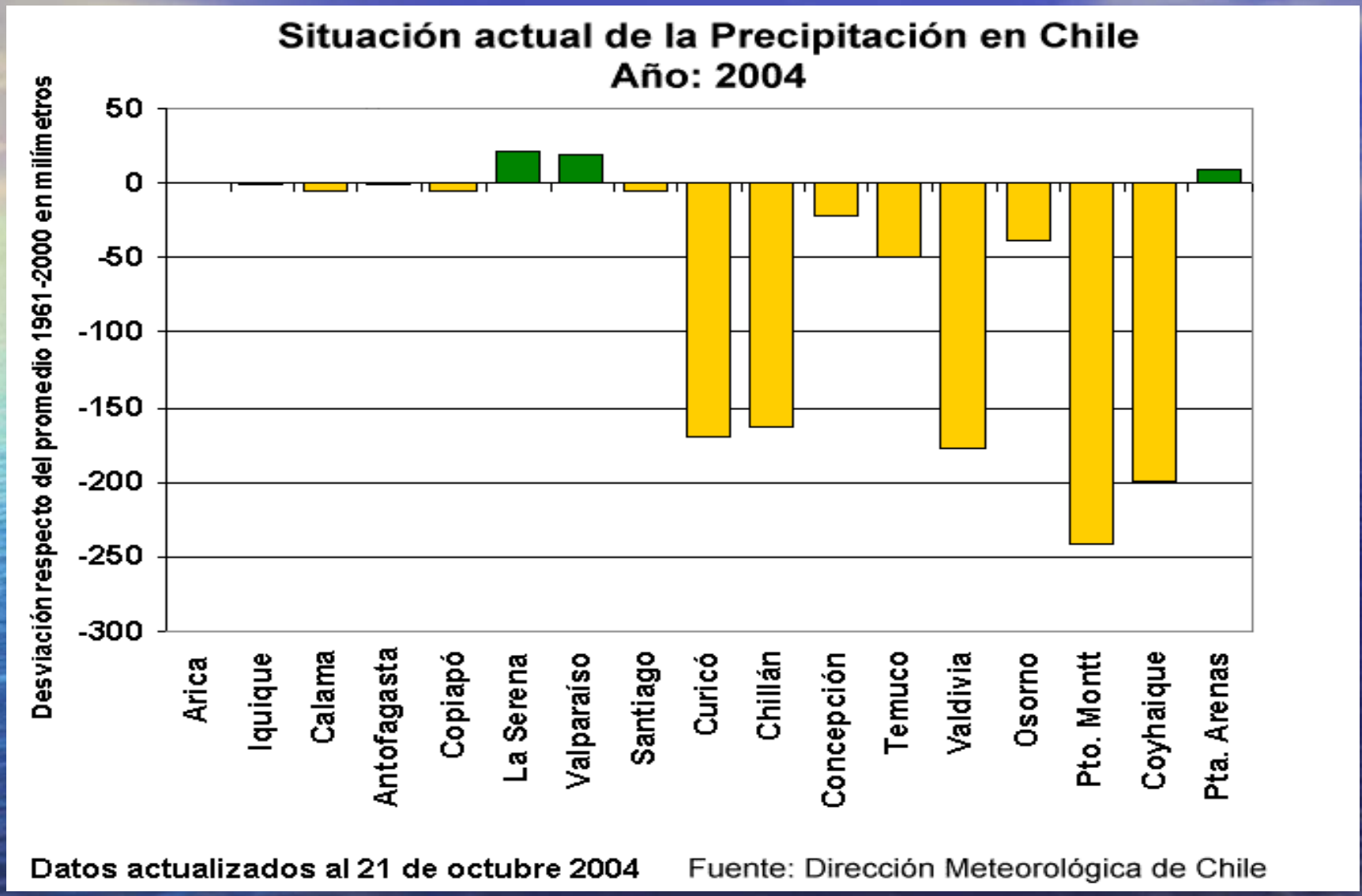
Precipitación por Tercil para el Trimestre Nov-Dic-Ene

Período de cálculo : 1950-2003

Ciudades	1° Tercil (Seco)	2° Tercil (Normal)	3° Tercil (Lluvioso)
La Serena (1)	0.0	0.0	> 0.1
Santiago (2)	0.0	0.0 - 0.4	> 0.4
Curicó (3)	0.0	0.0 - 7.4	> 7.4
Concepción (4)	0.0 - 6.7	6.8 - 31.4	> 31.4
Temuco (5)	0.0 - 29.7	29.8 - 65.3	> 65.3
Valdivia (6)	0.0 - 51.3	51.4 - 98.9	> 98.9
Pto. Montt (7)	0.0 - 75.0	75.1 - 118.3	> 118.3
Coyhaique (8)	0.0 - 45.8	45.9 - 74.7	> 74.7
Pta Arenas (9)	0.0 - 22.3	22.4 - 35.6	> 35.6

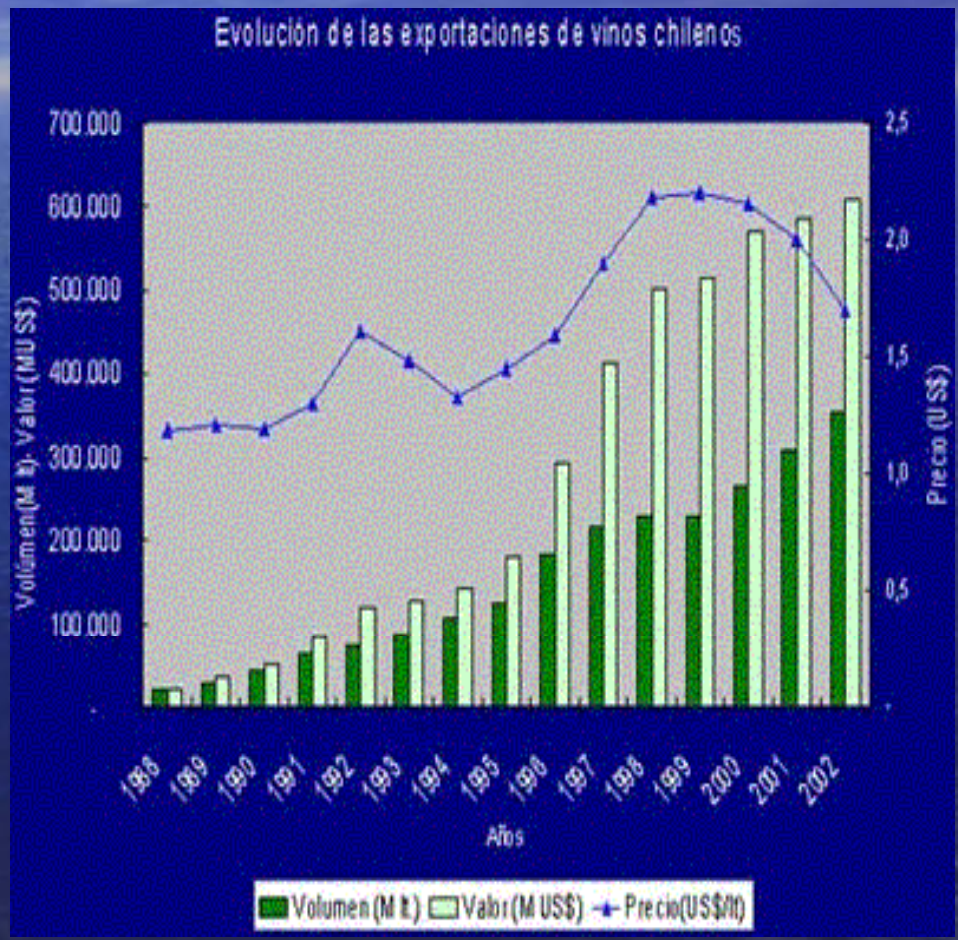
0.0 mm = Trazas




Situación actual de la Precipitación en Chile
Año: 2004
Desviación respecto del promedio 1961-2000 en milímetros
50
0
-50
-100
-150
-200
-250
-300
Arica
Iquique
Calama
Antofagasta
Copiapó
La Serena
Valparaíso
Santiago
Curicó
Chillán
Concepción
Temuco
Valdivia
Osorno
Pto. Montt
Coyhaique
Pta. Arenas
Datos actualizados al 21 de octubre 2004
Fuente: Dirección Meteorológica de Chile

AGRICULTURE ACTIVITY : FRUIT SECTOR

CHILEAN WINE EXPORTATION



FINAL REMARKS

- El Niño y La Niña are recurrent phenomenon and affect the chilean territory by altering atmospheric conditions that prevailed each phase
- The use of preliminary statistic methodology for doing a seasonal forecast seems to be an adequate alternative or complementary to the numerical model seasonal forecast
- It is necessary to continue advancing in the development and improve of this methodology and in the future combine it with dynamical models
- The use of seasonal forecast is justified given the important of Knowing the seasonal precipitation behavior for different economic activities in central and southern Chile


Thank you