

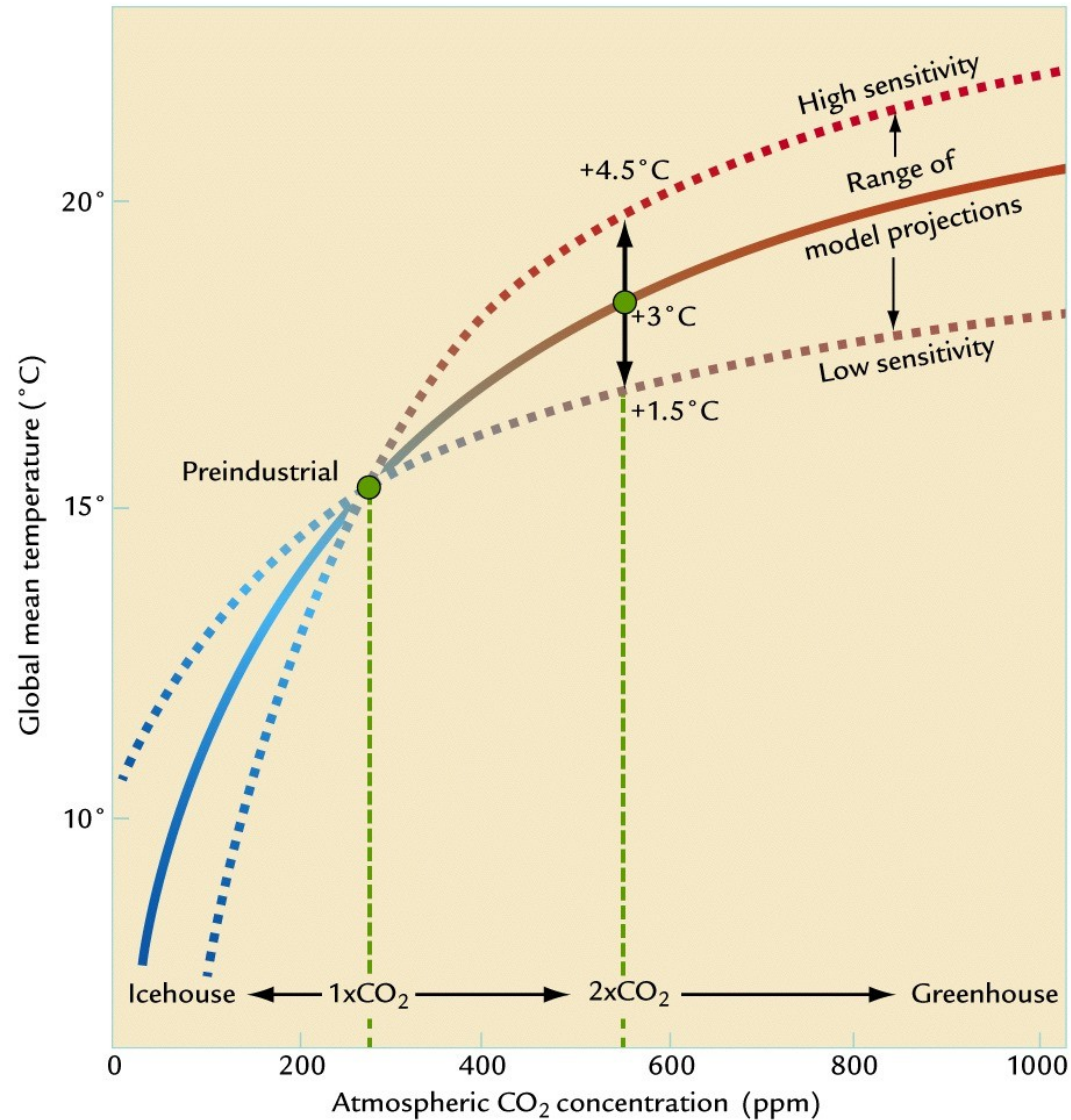
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# Nuevos desafíos del Cambio Climático

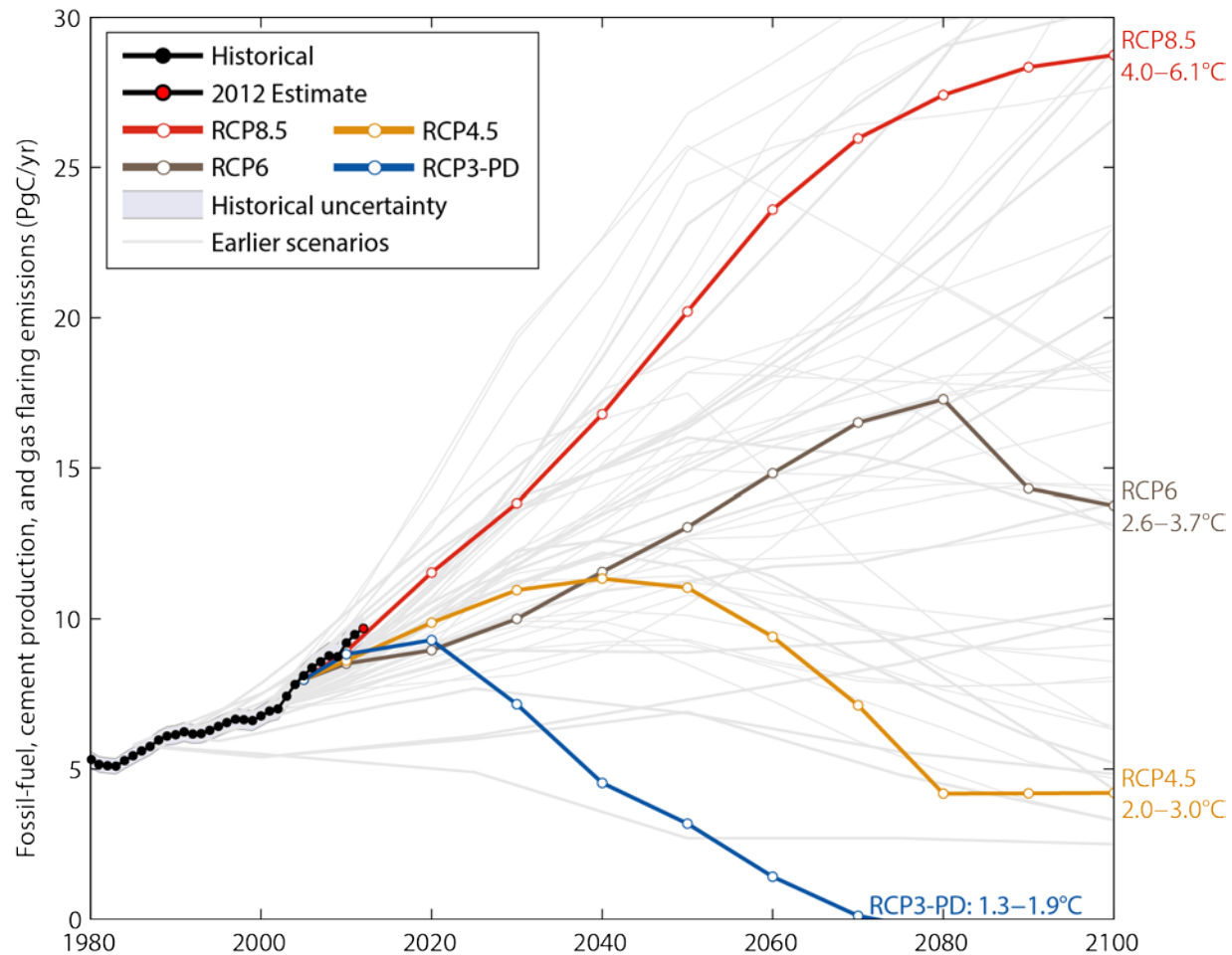
René Garreaud

Prof. Titular, Dpto. de Geofísica, Universidad de Chile  
Subdirector, Center for Climate and Resilience Research (CR)<sup>2</sup>

# Importancia de CO<sub>2</sub> en sistema climático



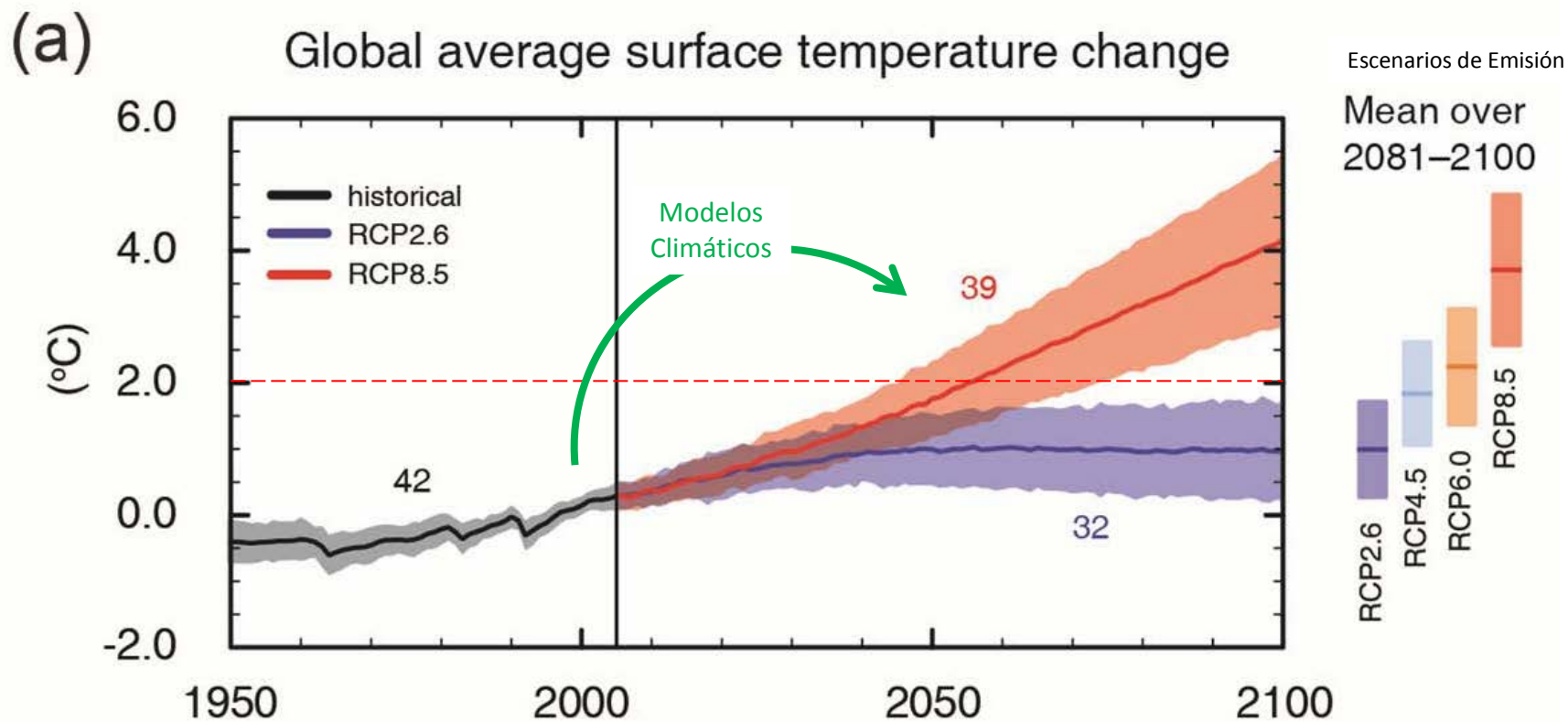
# Y como vamos con la mitigación?



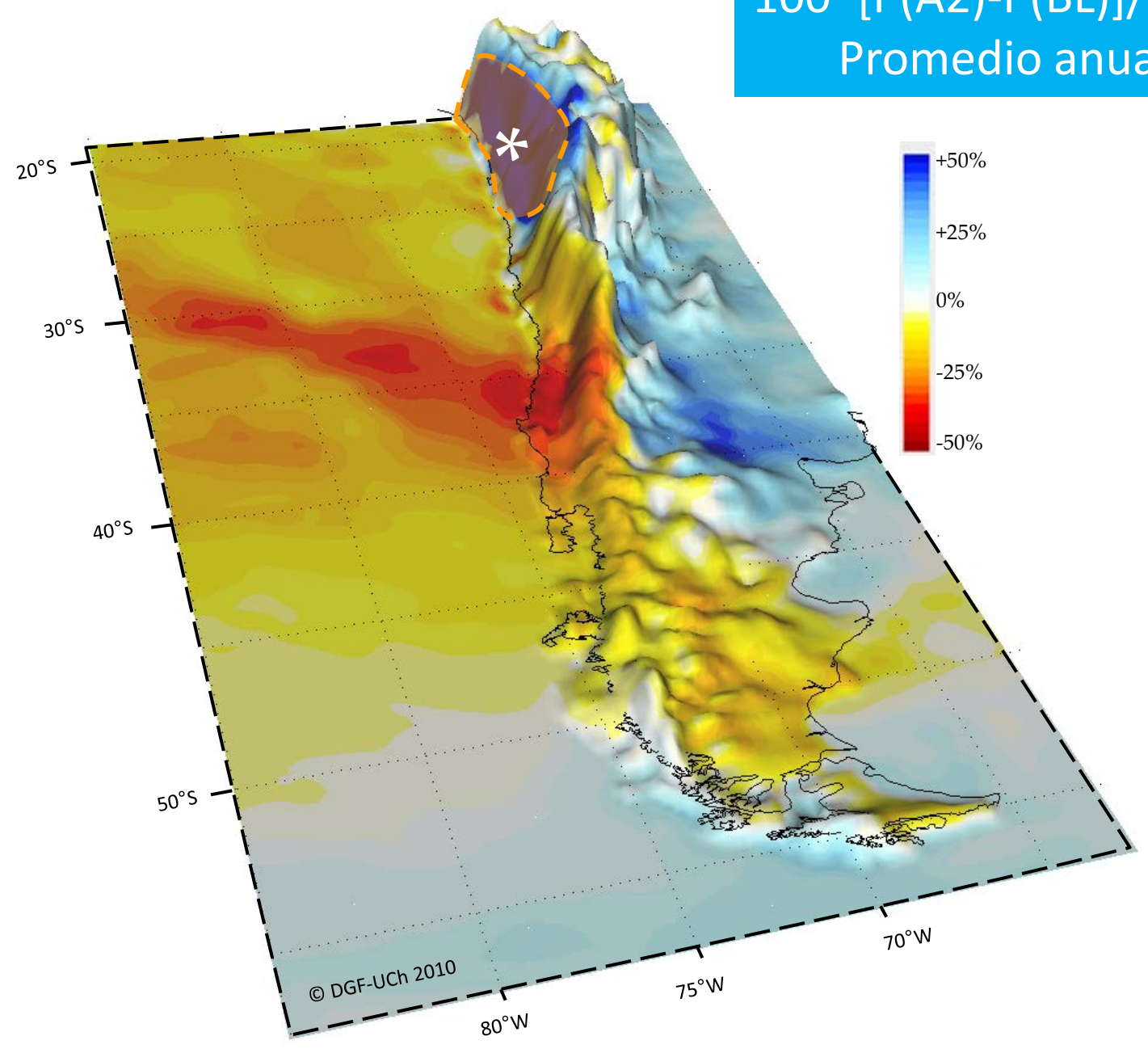
Linear interpolation is used between individual datapoints

Source: [Peters et al. 2012a](#); [Global Carbon Project 2012](#);

# Pronóstico para mañana...

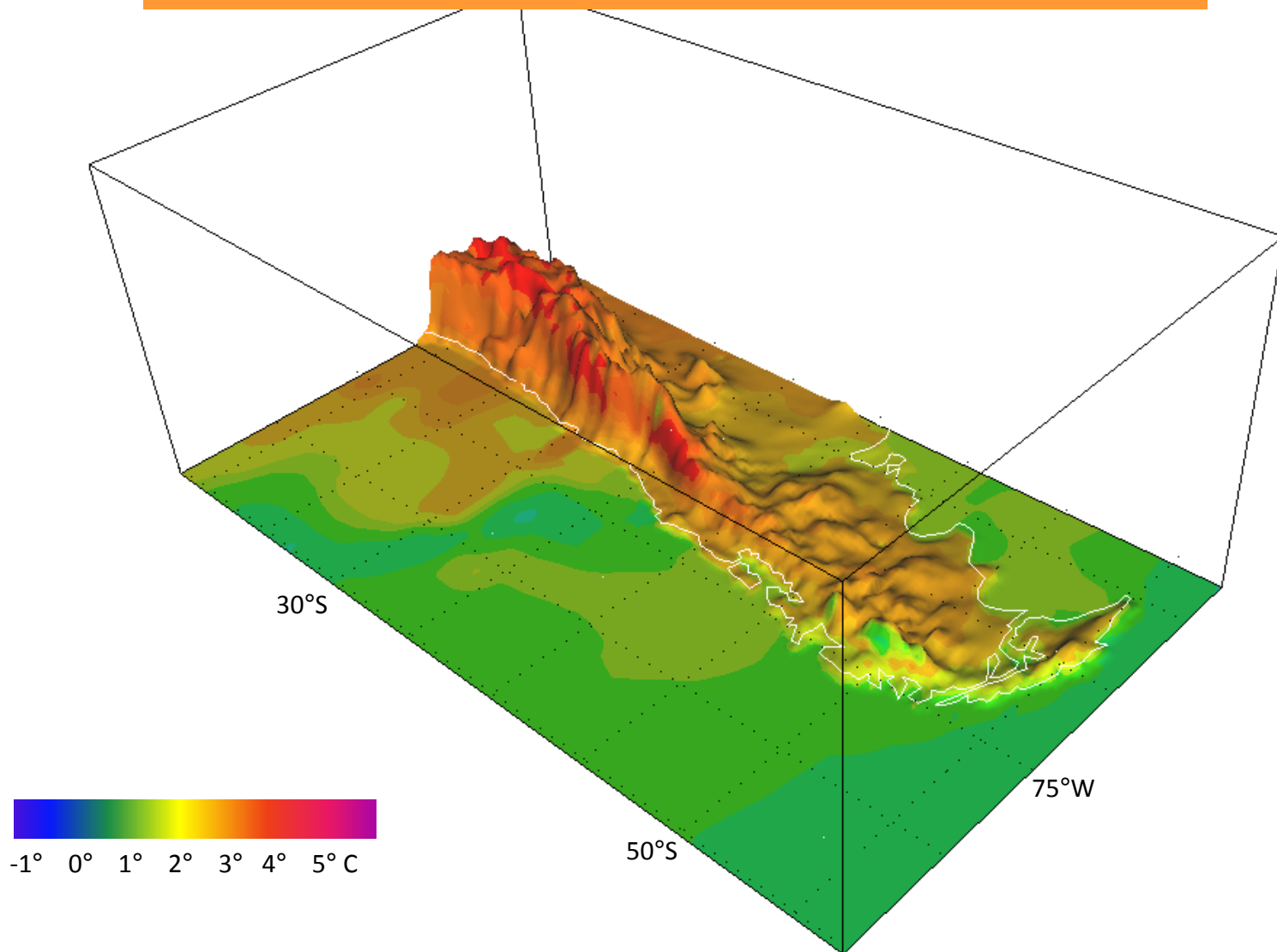


$100 * [P(A2) - P(BL)] / P(BL)$   
Promedio anual



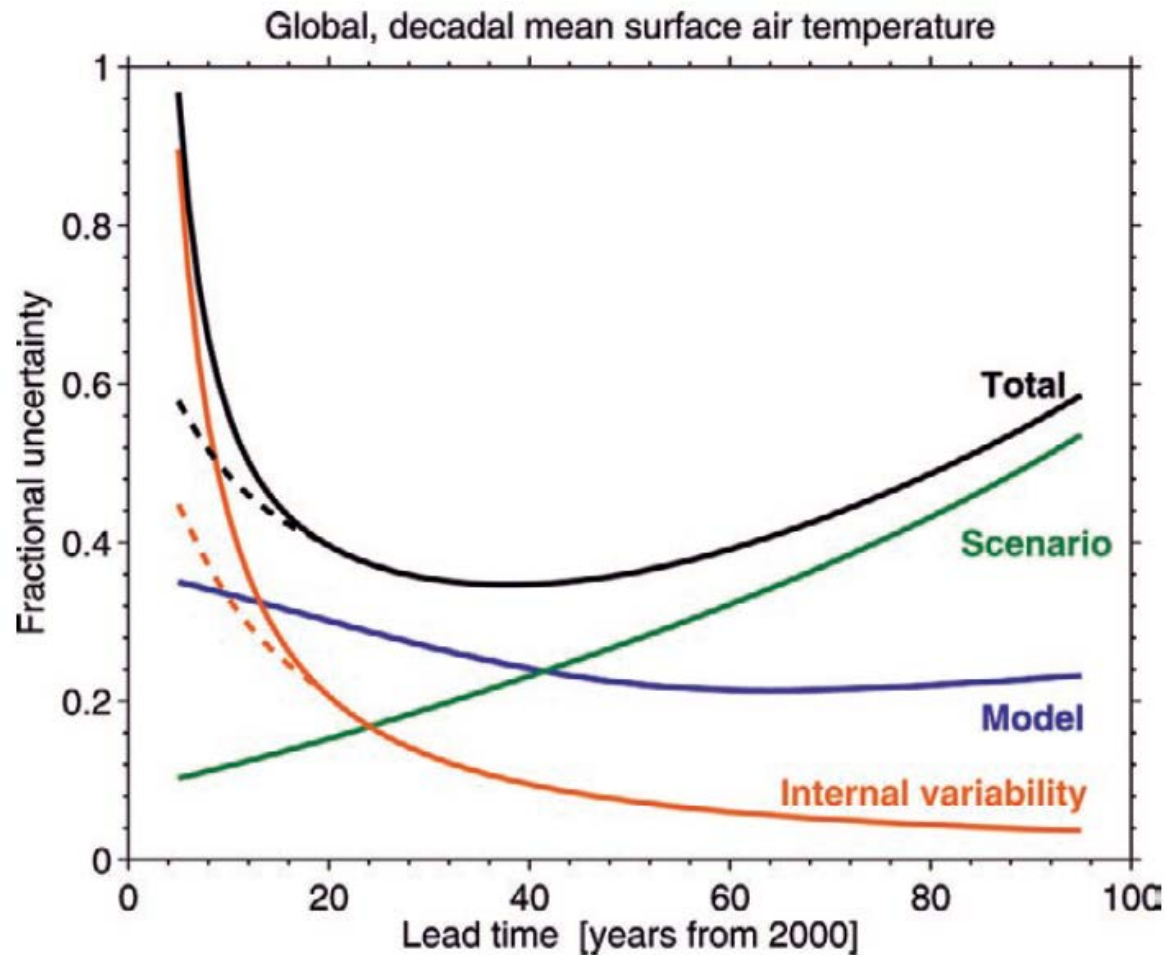
© DGF-UCh 2010

# Diferencia Temperatura 2-m A2-BL

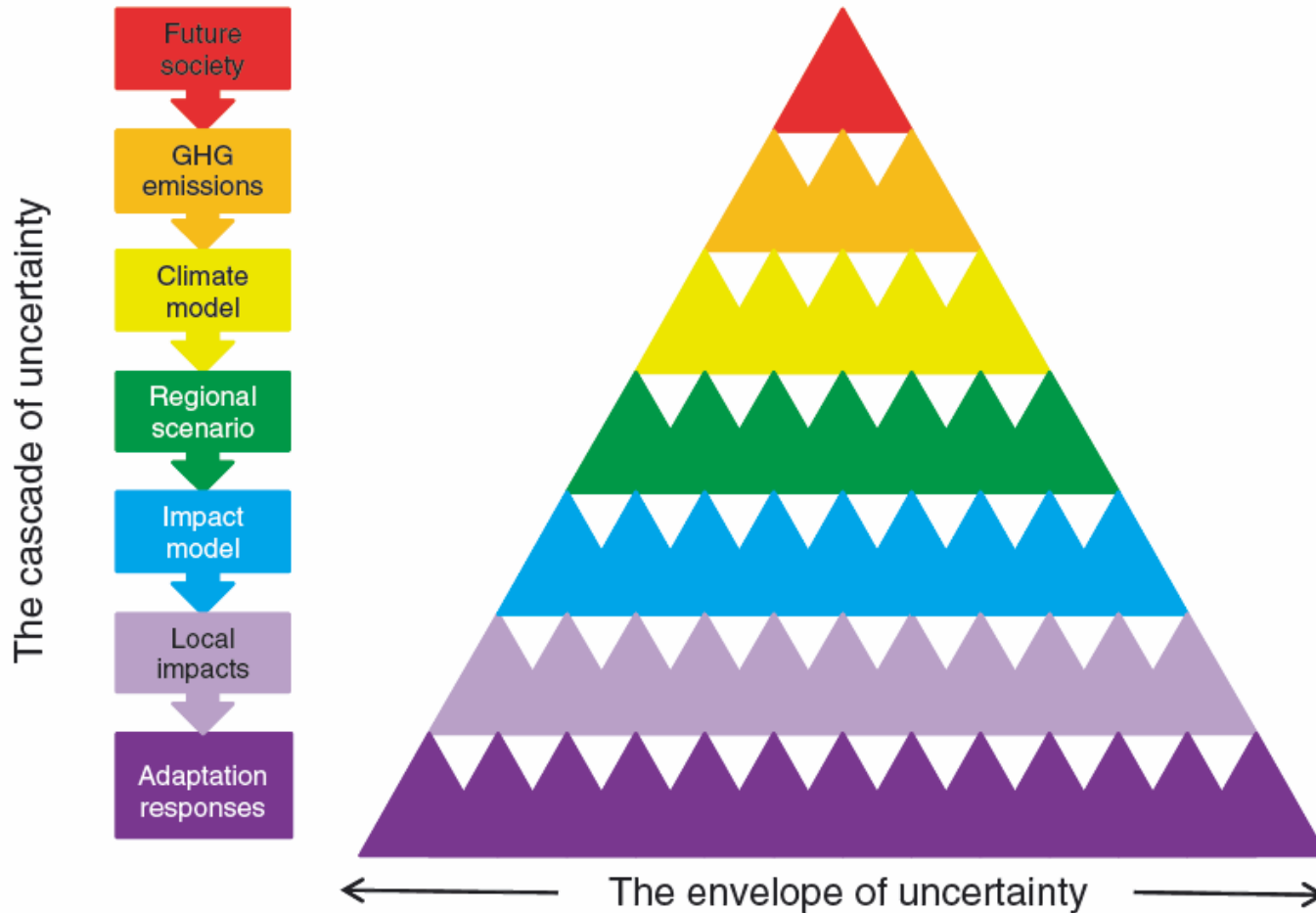


# La letra chica...

Alta incertidumbre en magnitud de cambio en futuro cercano y lejano...



# El desafío...



¿Como ayudamos al “tomador de decisiones”?

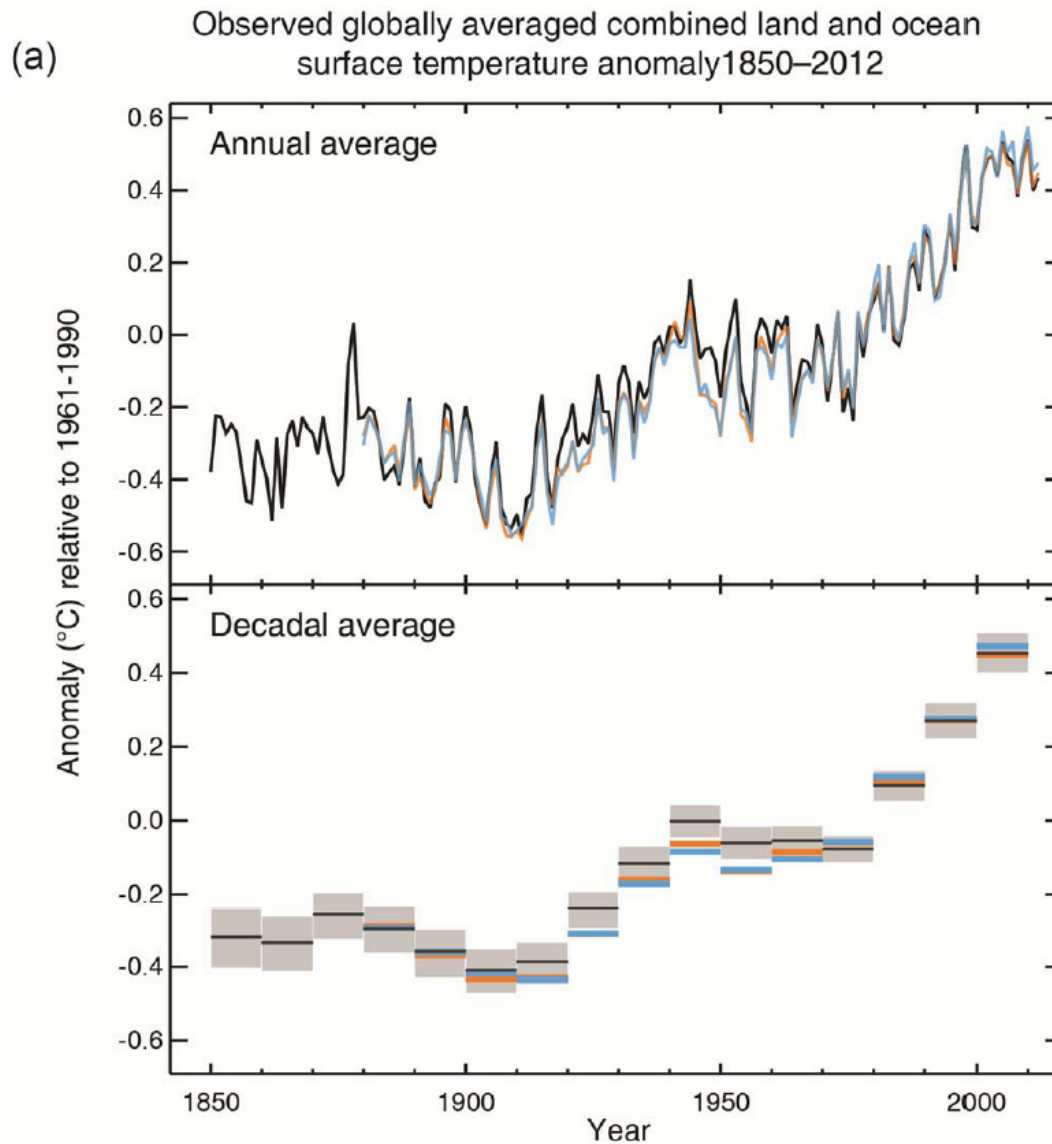


## Palabras del AR5-IPCC (2013)

Warming of the climate system is unequivocal, and since the 1950s, many of the observed changes are unprecedented over decades to millennia. The atmosphere and ocean have warmed, the amounts of snow and ice have diminished, sea level has risen, and the concentrations of greenhouse gases have increased.

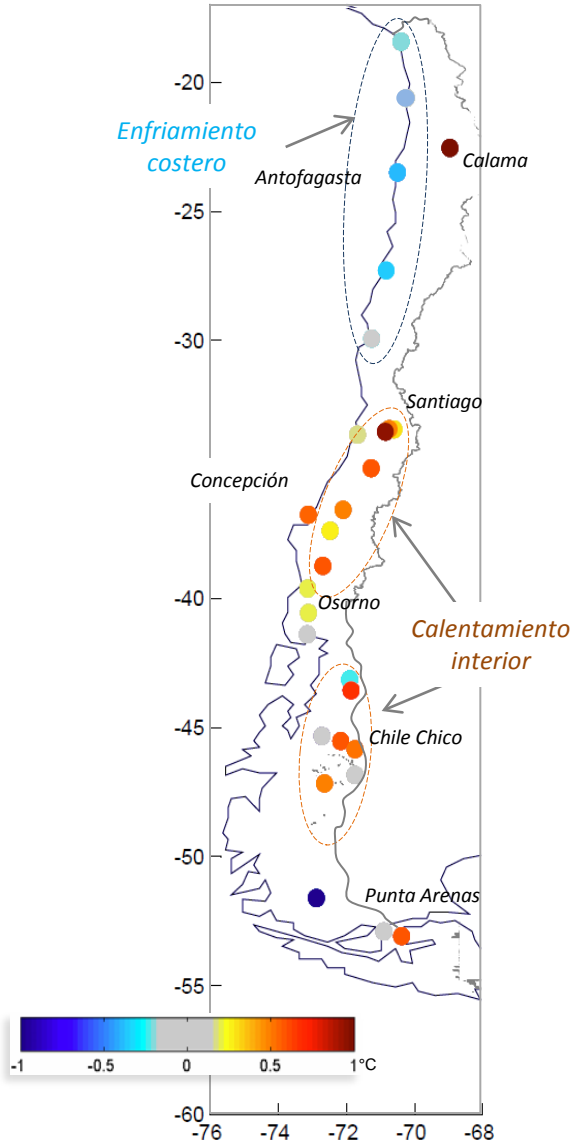
Human influence has been detected in warming of the atmosphere and the ocean, in changes in the global water cycle, in reductions in snow and ice, in global mean sea level rise, and in changes in some climate extremes. This evidence for human influence has grown since AR4. **It is extremely likely** that human influence has been the dominant cause of the observed warming since the mid-20th century.

# Nuestro clima cambiante: El planeta

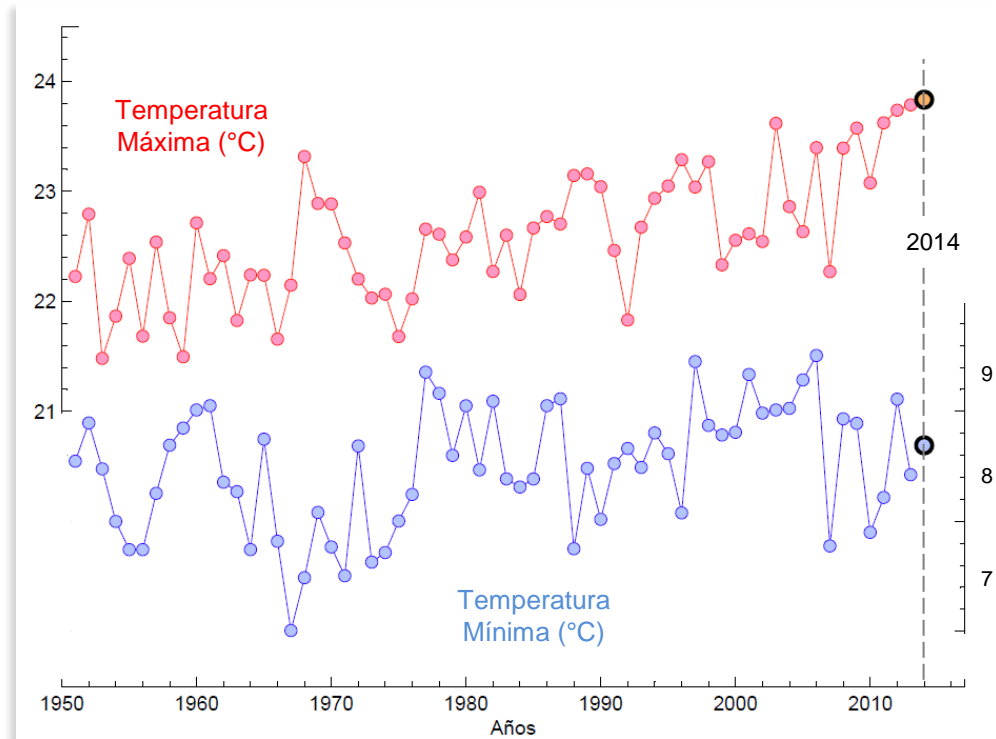


# Temperatura Media (◆)

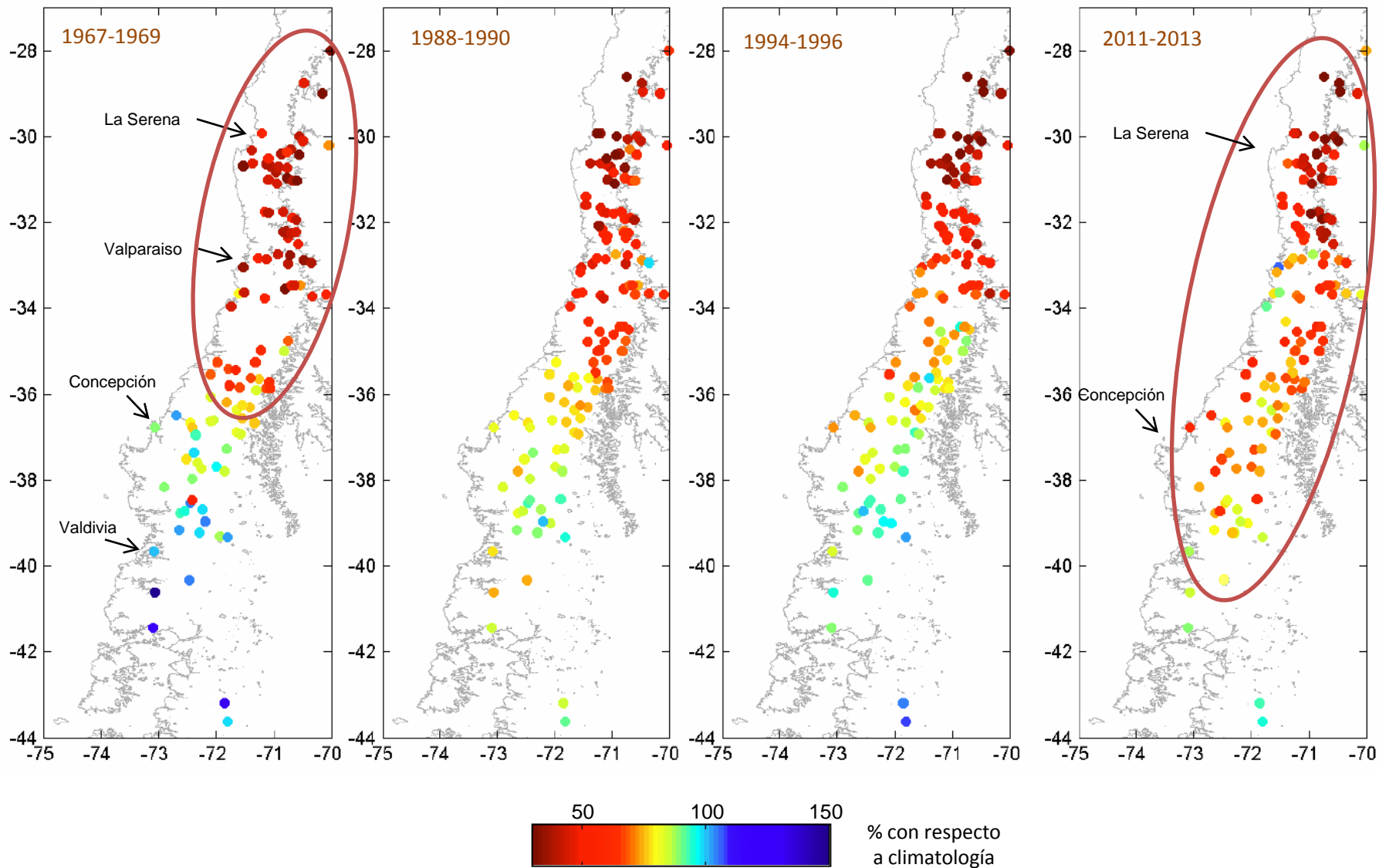
Promedio 2014 – Climatología(\*)



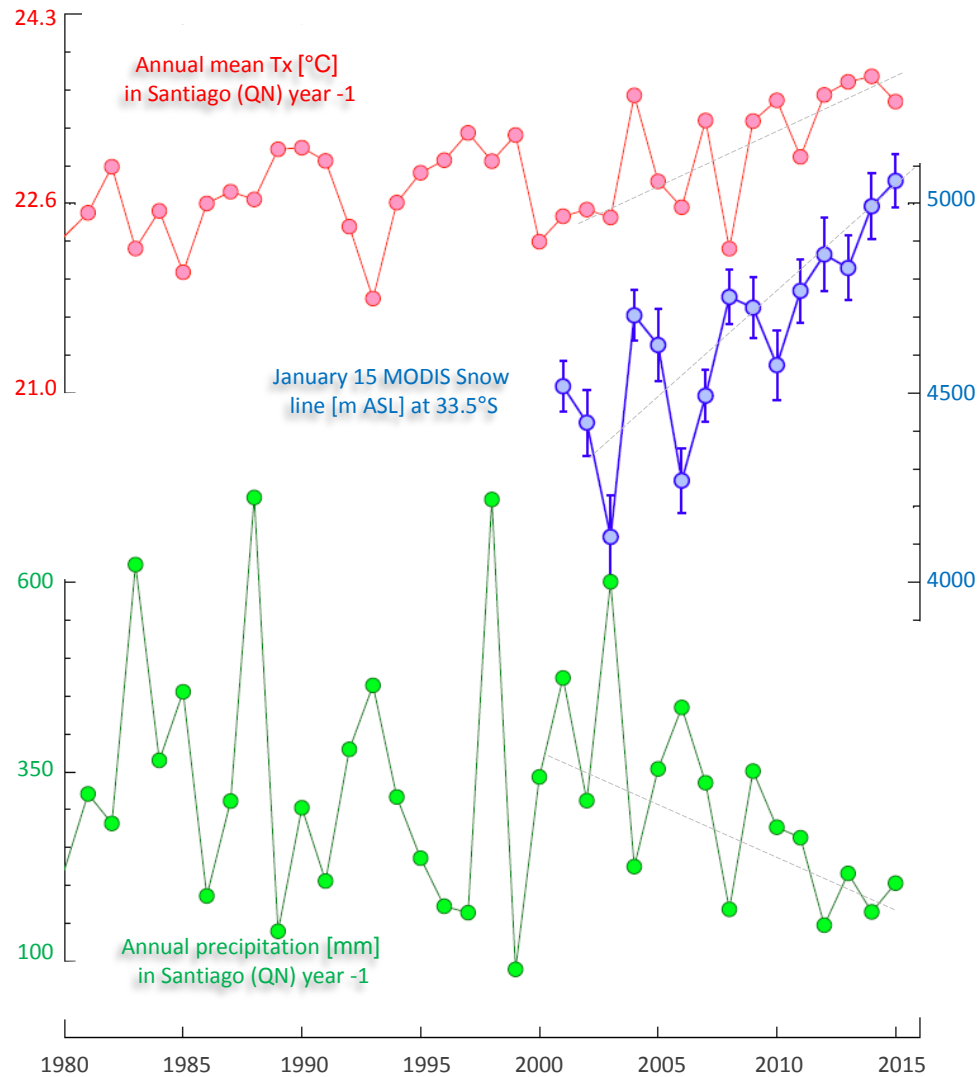
## Santiago, Quinta Normal



# Grandes sequías contemporáneas

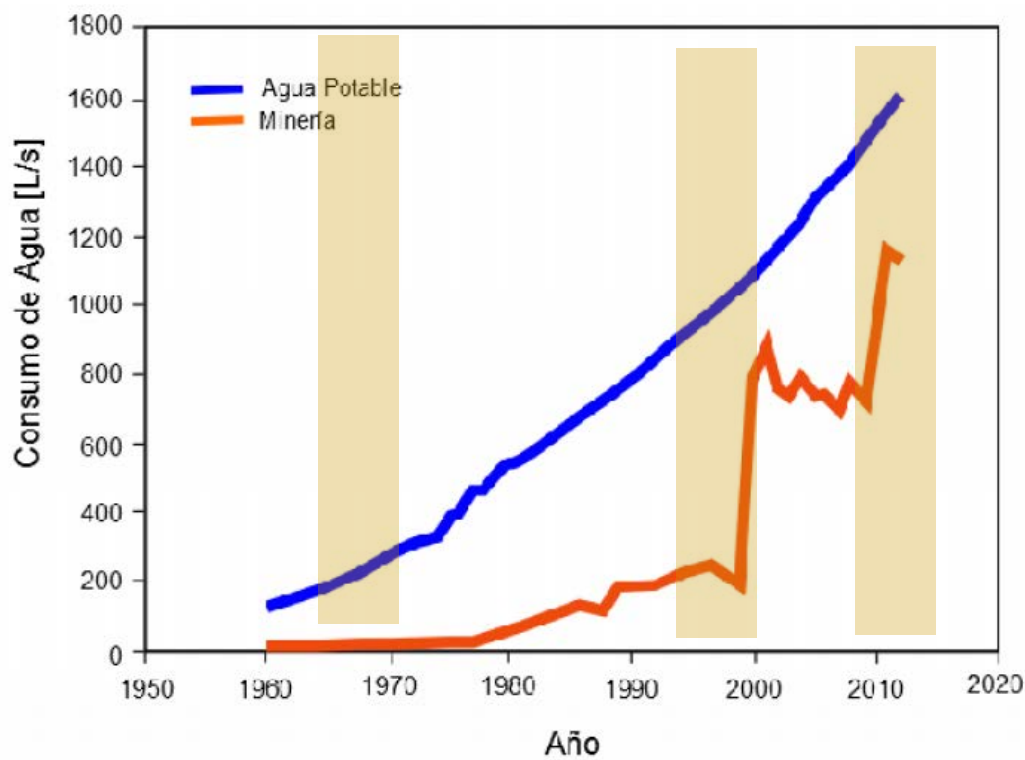


# Cada vez menos nieve....



# Deficit Pluvial y Demanda de Agua

Consumo de agua en la región de Coquimbo.  
Nuñez et al. 2013

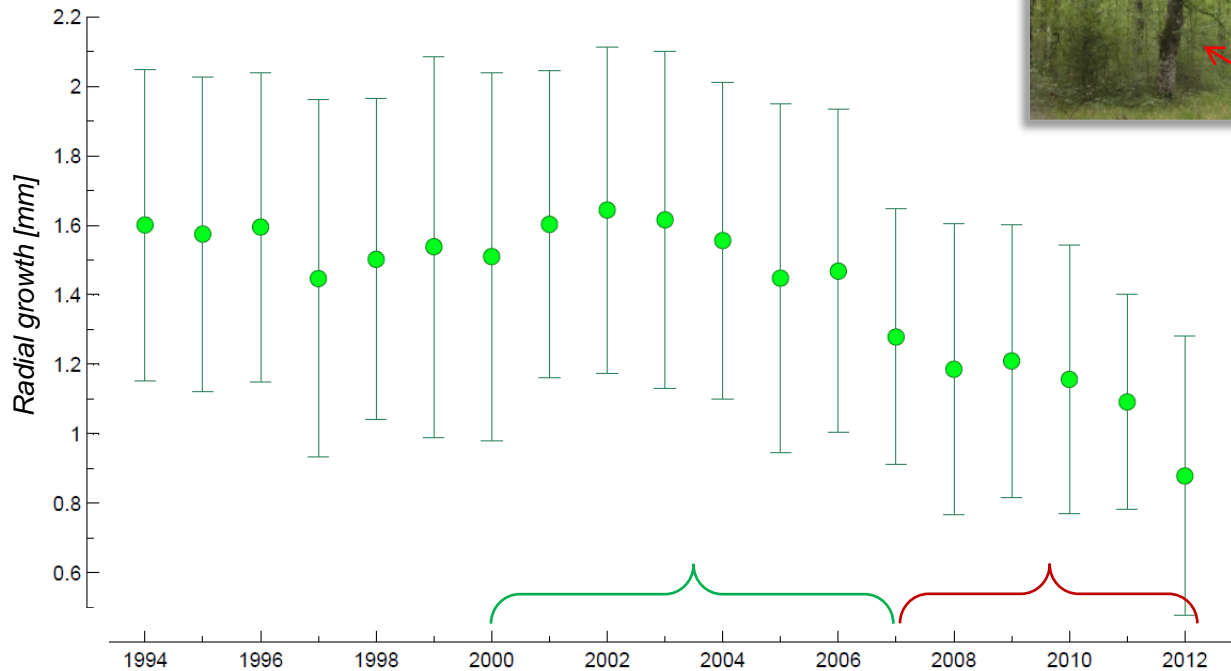
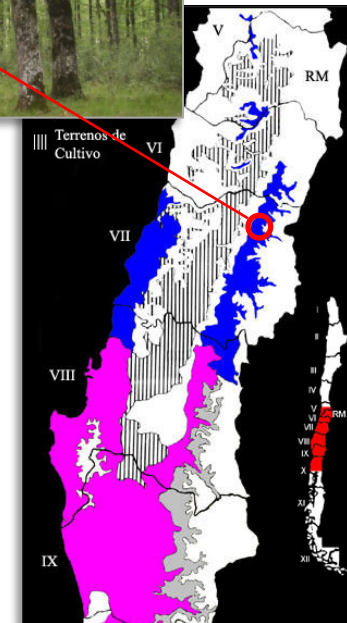


SUPERFICIES REGADAS SEGÚN CENSOS			
REGIÓN	CENSOS		%
	1996/97	2006/07	
I	8.039	12.301	53
II	2.962	2.294	-23
III	14.264	19.354	36
IV	49.526	75.714	53
V	68.962	86.157	25
RM	145.357	136.757	-6
VI	208.651	210.693	1
VII	318.326	299.102	-6
VIII	180.808	166.574	-8
IX	50.893	49.772	-2
X	7.060	12.535	78
XI	3.485	2.717	-22
XII	1.792	19.844	-
<b>Total</b>	<b>1.060.125</b>	<b>1.093.814</b>	<b>3</b>

# Monte Oscuro - Maule foothills

*Nothofagus obliqua* (Roble)

41 isolated trees + 81 surrounded trees



Wet versus dry periods

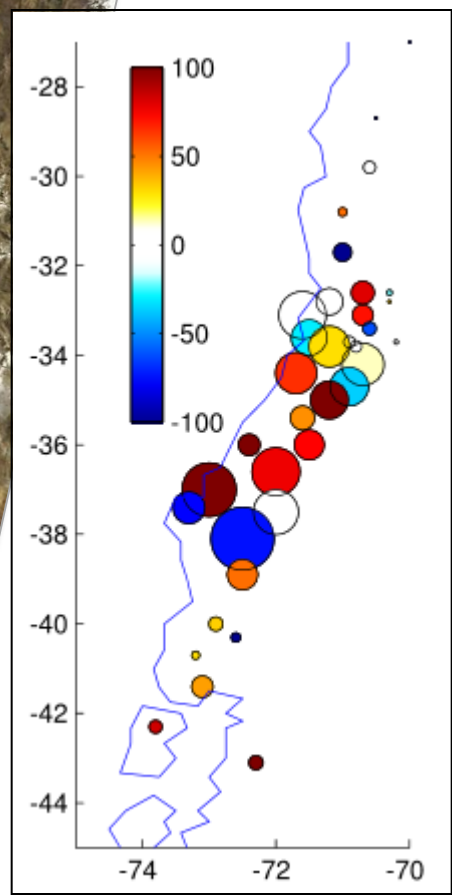
- 40% less precipitation (1630 → 1602 mm/yr)
- 25% less radial growth ( 1.7 → 1.3 mm/yr)
- 11% less volume growth ( 7.1 → 6.2 m<sup>3</sup>/ha) →  $\Delta$ CO<sub>2</sub> Sequestration?

P. Corvalán, M. Galleguillos,  
J. Hernández, R. Garreaud



MODIS-TERRA  
08 Enero 2014  
11:55 Hora Local

Dry-Wet Area burned  
by province (%)



60 km

Constitución

Curicó

Ranca  
gua

Talca

<http://lance-modis.eosdis.nasa.gov>  
Adaptada @ DGF/(CR)<sup>2</sup> UCh





Cautín  
Toltén  
Valdivia

**(CR)<sup>2</sup>**

Center for Climate  
and Resilience Research  
[www.CR2.cl](http://www.CR2.cl)

*Earth system science for Chile:  
a sound basis for building resilience in a changing climate*

Sponsoring Institution



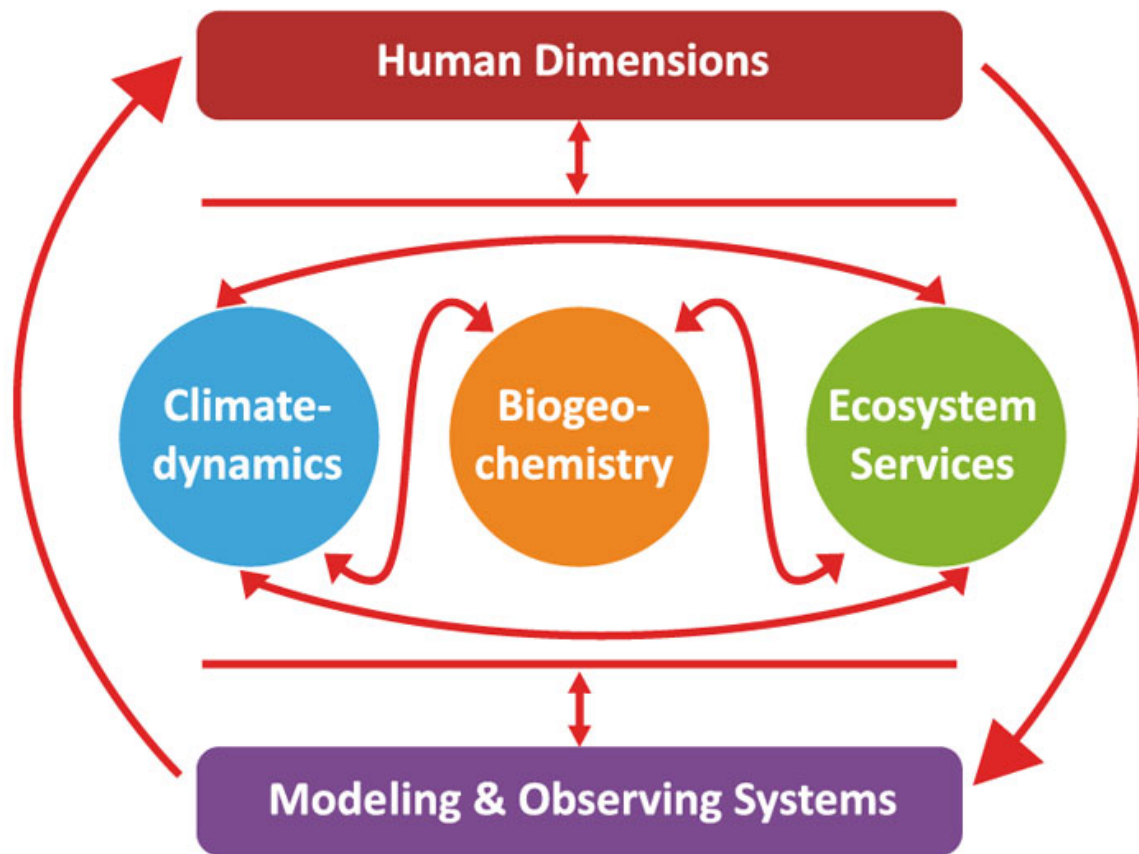
Associated Institutions



Funding Agency



# Líneas de Trabajo



## Problemas País y Macro zonas de estudio:

- Variabilidad y escasez de los recursos hídricos (Norte y centro del país)
- Expansión Urbana (zonas centro y sur del territorio nacional)
- Rápido cambio de uso del suelo en las (centro y sur de Chile)
- Dimensión Humana: Impactos y Adaptación