



Stratosphere Historical Forecast Project

a WGSIP-SPARC project

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Andrew Charlton-Perez + WGSIP members

Stratospheric extension of the CHFP

High Top Hindcasts

Parallel to WGSIP-CHFP

Extended models

Initialising extra atmosphere, better represented stratosphere

Integrations

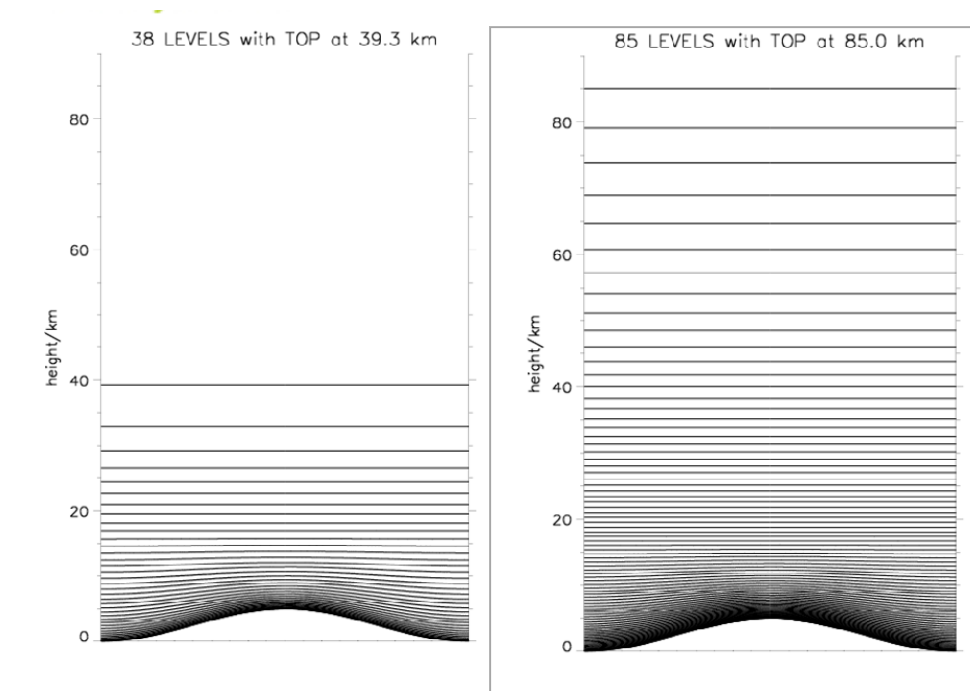
- 4 month lead times (1st November and 1st May start dates)
- 2 seasons (DJF and JJA)
- Case study years: 1989 onwards
- At least 6 members per year, preferably more

Participants and Status

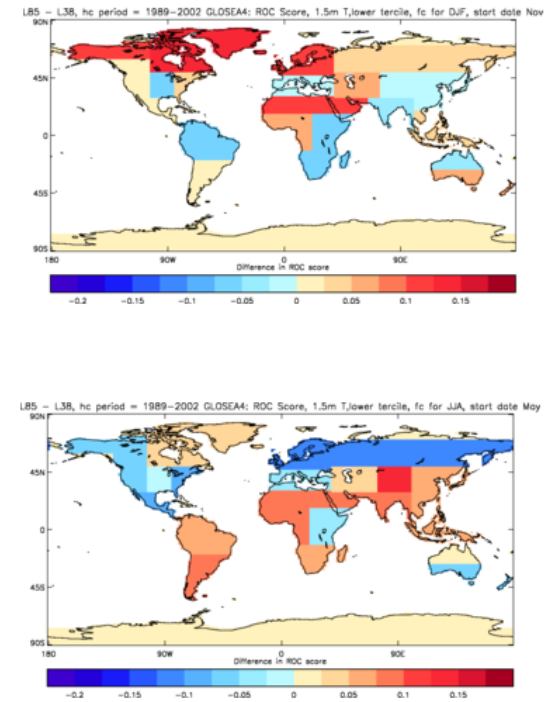
<u>Institute</u>	<u>Model</u>	<u>Resolution</u>	<u>Reference</u>	<u>Status</u>	<u>Contact</u>
UKMO	HadGEM	N96L85, 85km N96L38, 40km	Martin et al 2006, J. Clim., 19, 1217-1301	DONE IN SERVER	Adam.scaife@metoffice.gov.uk
Meteo France	Arpege 4.4 + OPA	L91, 0.01hPa L31, 10hPa	Guerey et al, 2005, Tellus, 57A, p308-319	DONE IN SERVER	Michel.deque@meteo.fr jean.philippe.piedelievre@meteo.fr
CCCMA	CMAM	T63L71, ~100km T63L41, ~31km	Scinocca et al 2008, ACP, 8, 7055-7074	DONE IN SERVER	John.Scinocca@ac.gc.ca George.Boer@ec.gc.ca
NCEP	CFS v1	L64, 0.2hPa	Saha et al, J. Clim., vol. 19, no. 15, p3483-3517	DONE IN SERVER	Amy.Butler@noaa.gov Arun.Kumar@noaa.gov

What are we expecting to see?

Analysis of UKMO stratosphere resolving hindcasts:



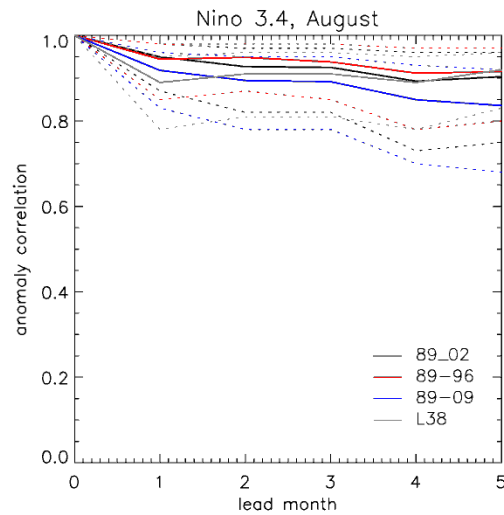
Low top and high top models



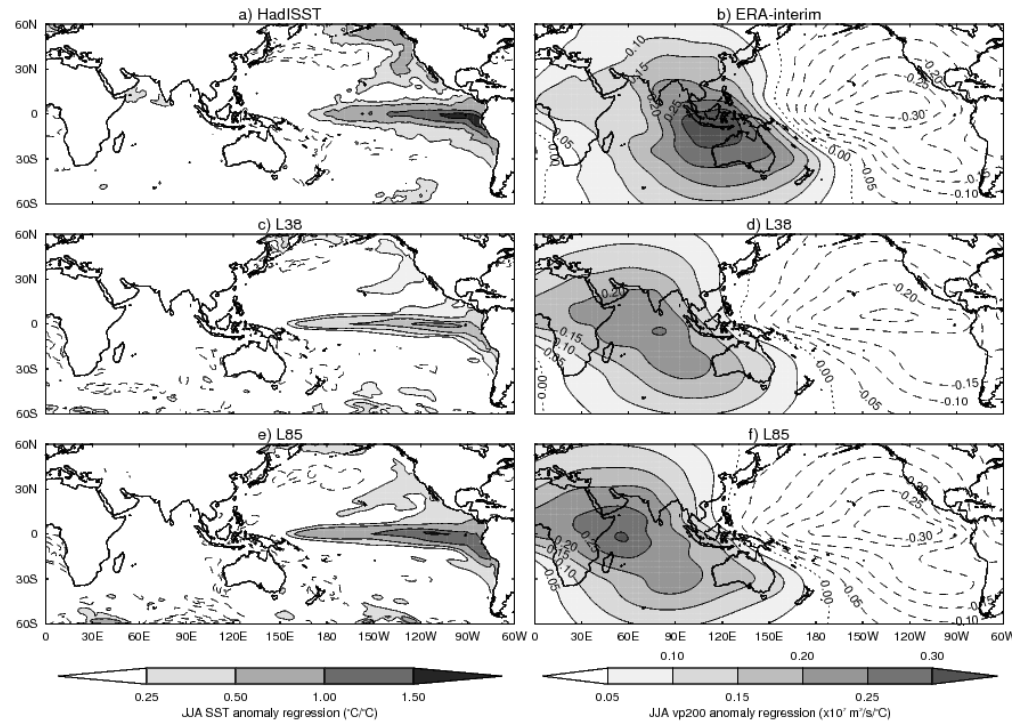
Possible improvement in ROC scores in winter but not significant

What are we expecting to see?

Analysis of UKMO stratosphere resolving hindcasts:



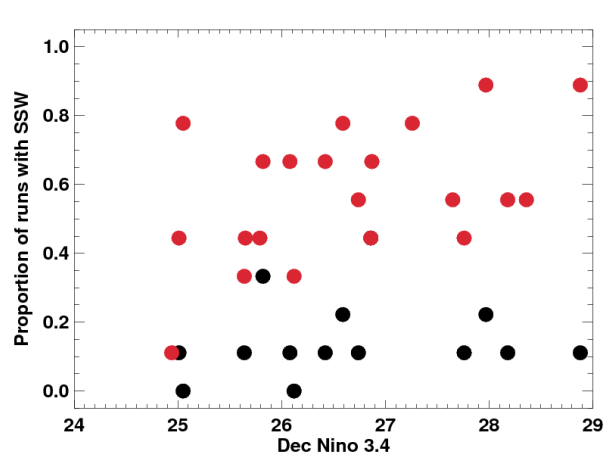
**No change in ENSO skill
(as expected)**



**Little change in ENSO structure
(as expected)**

What are we expecting to see?

Analysis of UKMO stratosphere resolving hindcasts:



Sudden stratospheric warmings occur with better frequency in high top hindcasts (red)

Increase in frequency with El Nino strength

Subsequent impact on surface....

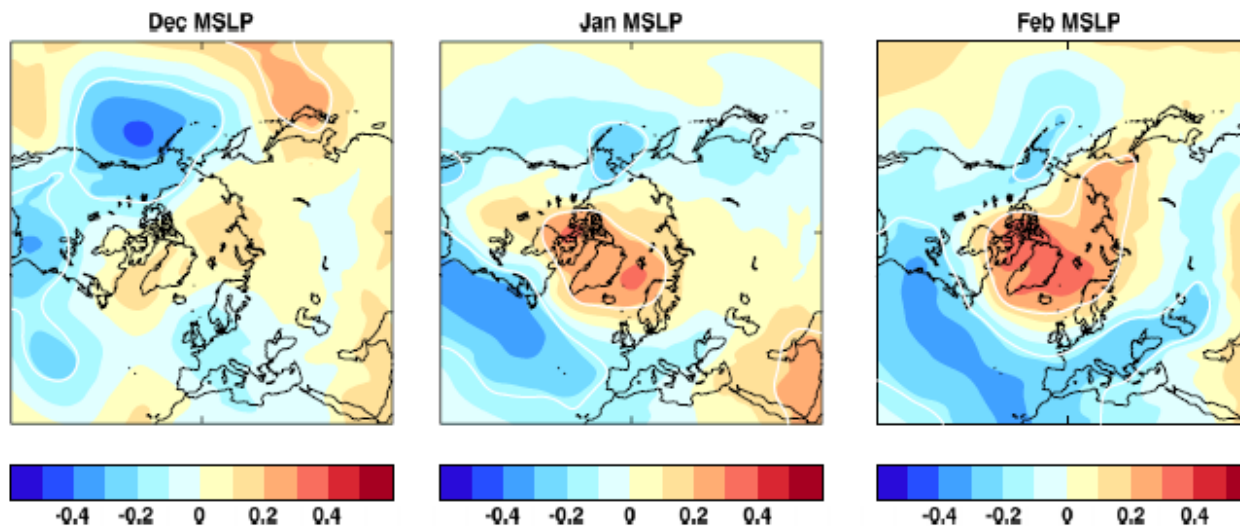
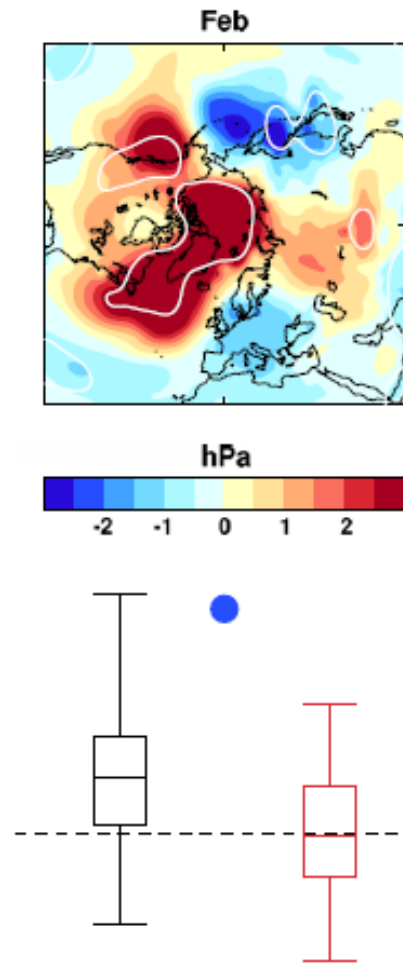


Figure 5. Correlation between SSW strength (based on minimum zonal wind at 60N, 10 hPa over the whole winter) and MSLP for L85 hindcasts. White contours show regions where correlation is significant at the 5% level.

What are we expecting to see?

Analysis of UKMO stratosphere resolving hindcasts:

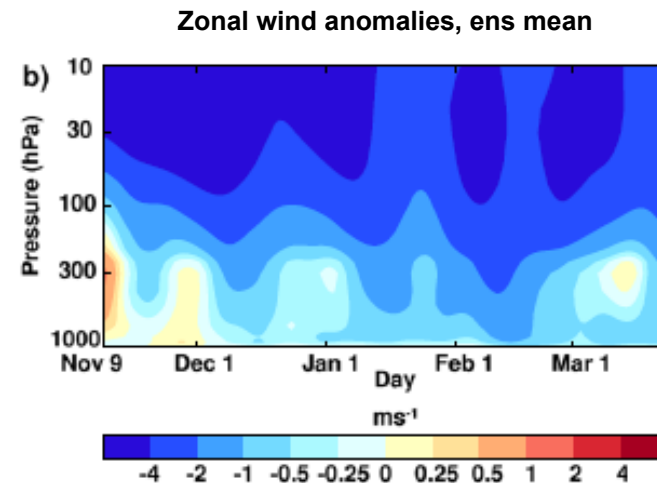


Winter 2009/10: stronger Arctic pressure signal

Significant

High top spans observations but low top doesn't

Conditional predictability for AO given active stratosphere....



Summary

High top and low top hindcasts now in CHFP database

Multimodel analysis underway

Analysis of individual systems implies no big gains in overall skill

However

Improved representation of stratospheric processes

Clear signatures of stratosphere-troposphere coupling in surface climate

Improved conditional predictability for key events like the record low AO in winter 2009/10