

Climate predictive drivers for the Mediterranean region

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Overview

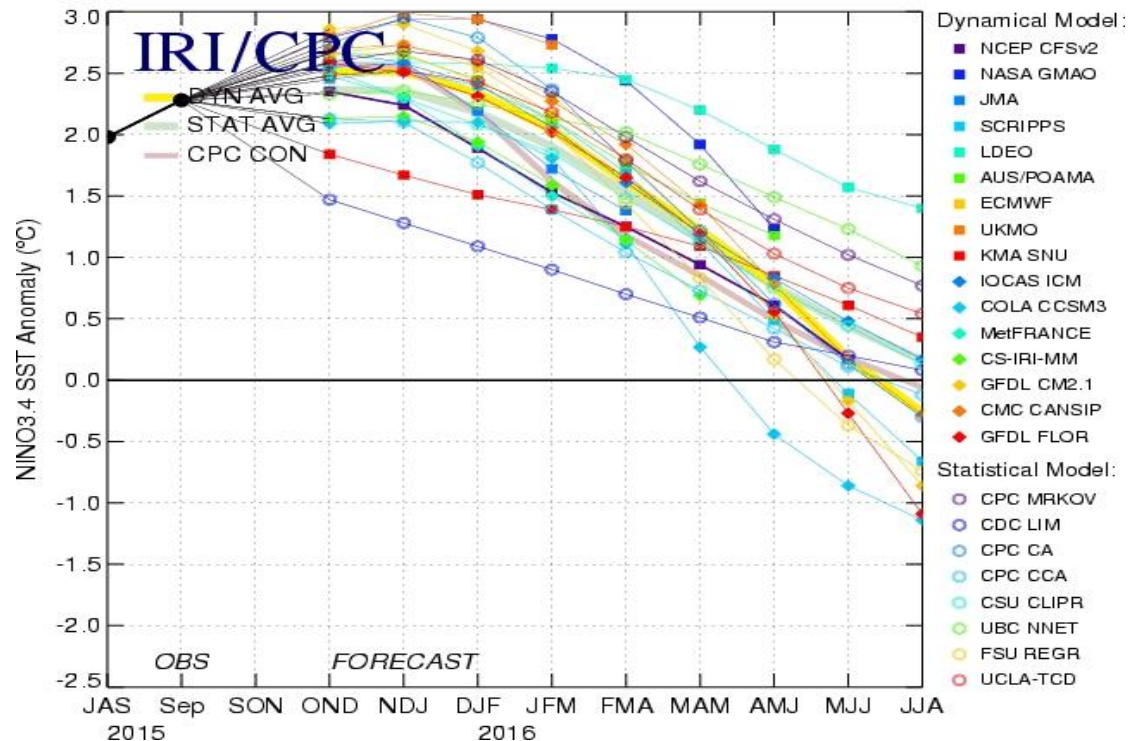
- SSTs
 - Tropical SSTs
 - El Nino
 - Tropical Atlantic Variability
 - North Atlantic
 - Lagged SSTs (May SSTs)
 - Present SSTs (cold blob)
 - Decadal variability in oceans
- Snow cover
- Arctic Sea ice
- Lower Stratosphere
- Other factors: global warming

El Niño

El Niño will likely peak during the Northern Hemisphere winter 2015 - 16, with a transition to ENSO – neutral anticipated during the late spring or early summer 2016 (CPC and IRI diagnostic issued on 12th of November 2015).

A strong and mature El Niño continues in the tropical Pacific Ocean. The majority of international climate outlook models indicate that the 2015-16 El Niño will strengthen slightly before the end of the year. Models and expert opinion suggest that peak 3-month average surface water temperatures in the east-central tropical Pacific Ocean will exceed 2 degrees Celsius above average, placing this El Niño event among the three strongest previous events since 1950 (1972-73, 1982-83, 1997-98) (WMO statement, 16th of November).

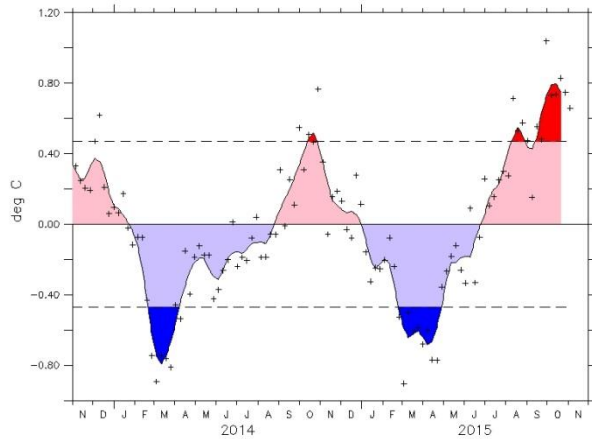
Mid-Oct 2015 Plume of Model ENSO Predictions



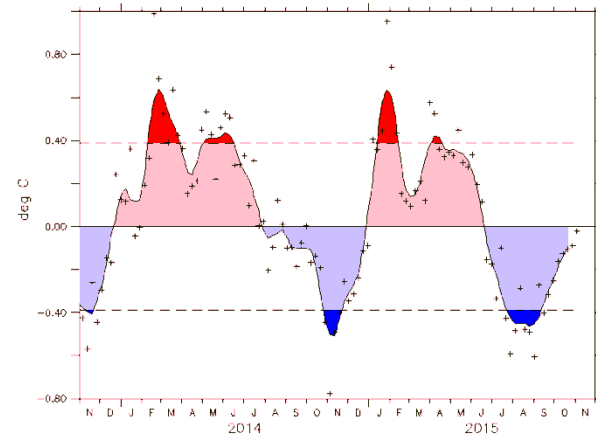
Possible enhanced frequency of blocking events in the 2nd part of the winter over the Euro-Atlantic region.

Tropical Atlantic Variability

South Atlantic Tropical (SAT) SST index



South Atlantic Tropical (SAT) SST index



Source: The index is calculated using the Reynolds Olv2 SST analysis, made available through the IRI Data Library, and is updated weekly (last update 11-NOV-2015).

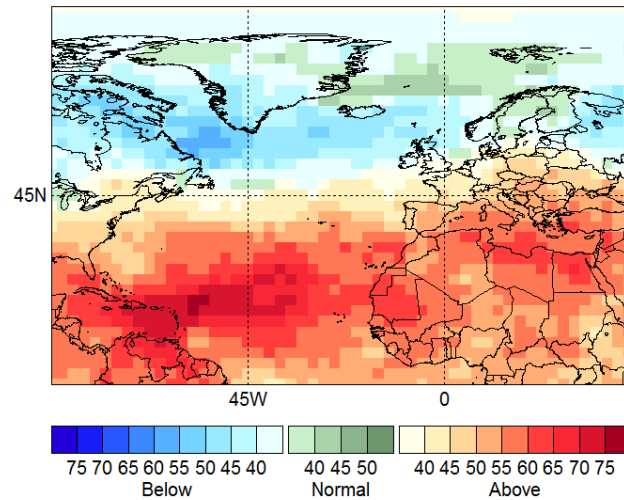
<http://stateoftheocean.osmc.noaa.gov/sur/at/>

Consistent with enhanced probability for negative NAO/AO.

May SST in the North Atlantic

DJF SLP prediction based on CCA model with
May SST with Climate Prediction Tool

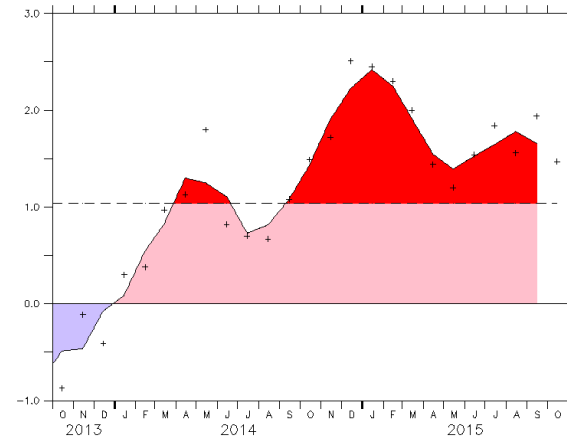
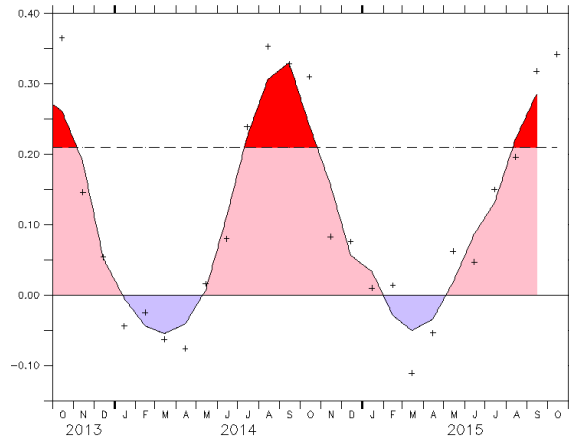
Probabilistic forecasts



Decadal variability in oceans

AMO

PDO



Source: The index is calculated by NOAA/ESRL (CDC) (last update 15-OCT-2015). .

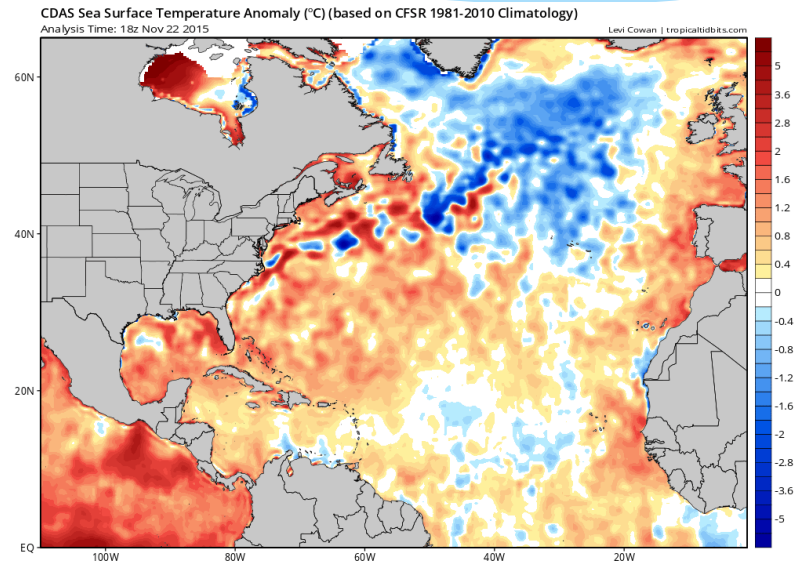
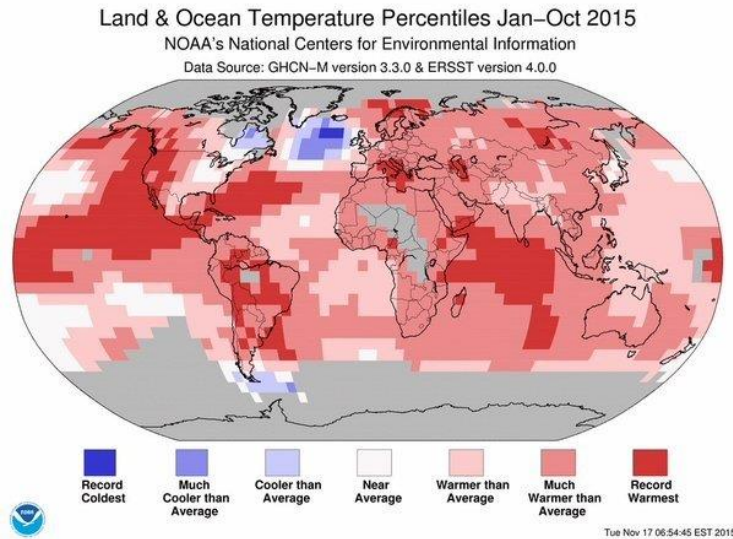
<http://stateoftheocean.osmc.noaa.gov/atm/pdo.php>

<http://stateoftheocean.osmc.noaa.gov/atm/amo.php>

AMO is telling us more about summer in Europe. Any hint about winter?

Cold Blob in the North Atlantic

CDAS SSTs on 18th of November 2015

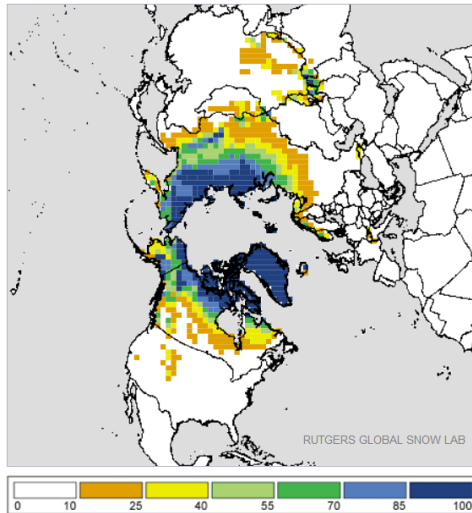


Possible effects on the jet stream position in the Atlantic-European area. Impact on winter conditions over Europe?

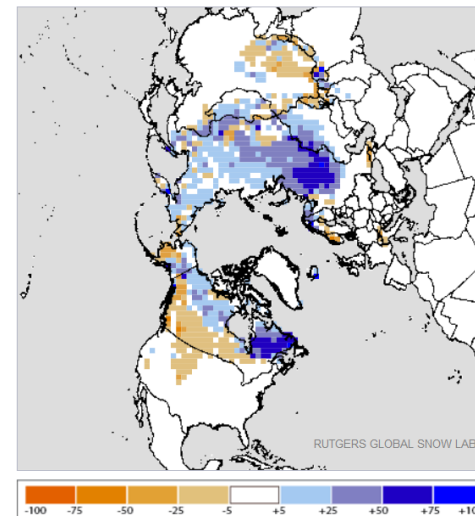
Snow cover climatology

Snow cover anomalies

Monthly Climatology - October



Departure from Normal - October 2015

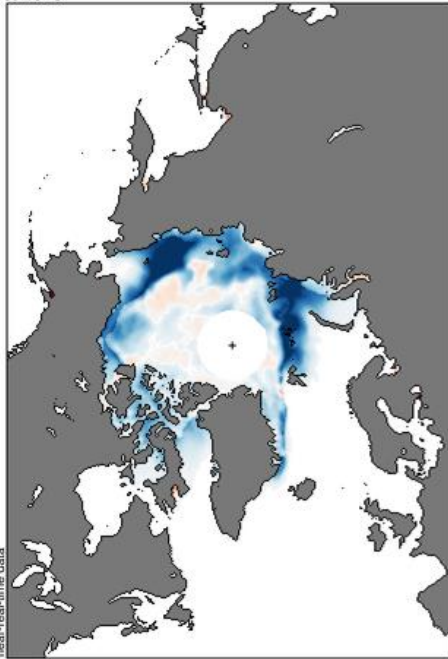


Source: Rutgers University (USA)
<http://climate.rutgers.edu/snowcover>

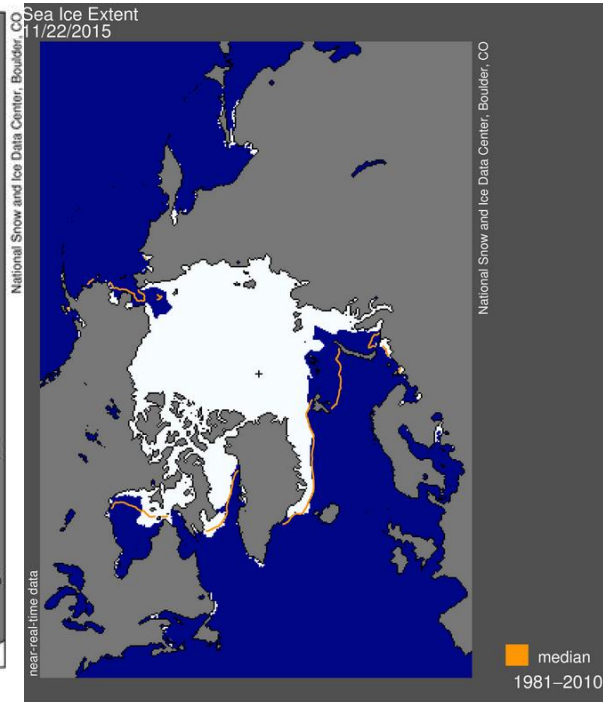
Extended snow cover over the Southern Siberia is consistent with the negative AO/NAO.

Arctic Sea Ice

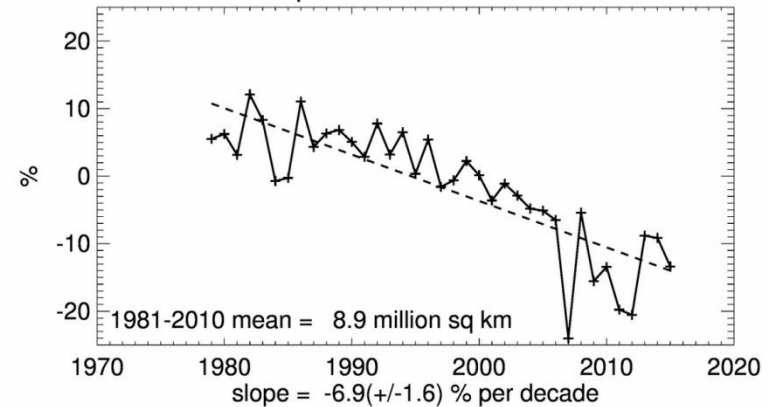
Sea Ice Concentration Anomalies
Oct 2015



Total anomaly = -1.4 million sq km



Northern Hemisphere Extent Anomalies Oct 2015



Source: NSIDC (USA)

http://nsidc.org/data/seaice_index/

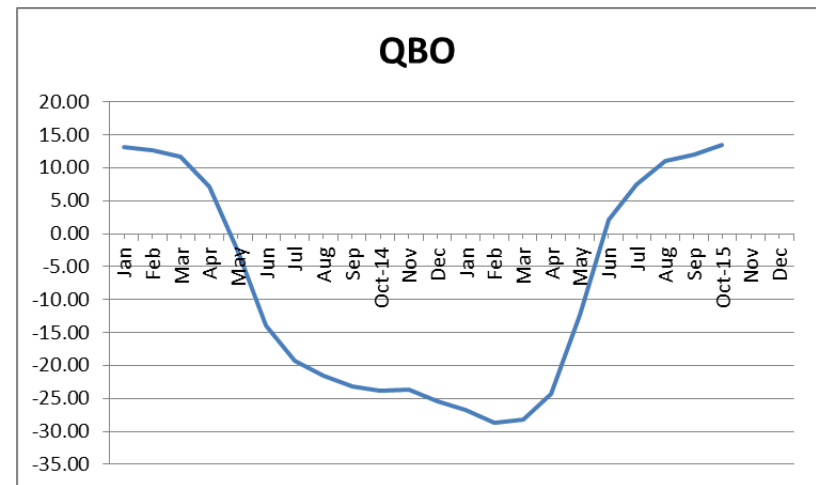
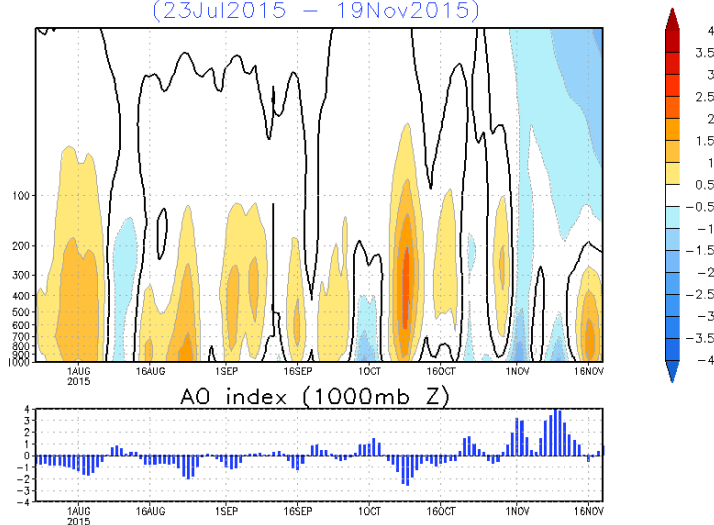
Anomalies in the ice extent over Arctic regions are usually related with atmospheric blockings over Europe.

Conditions in the stratosphere

Strong Polar vortex

Westerly QBO

Normalized GPH anomaly (65°N–90°N)
(23Jul2015 – 19Nov2015)

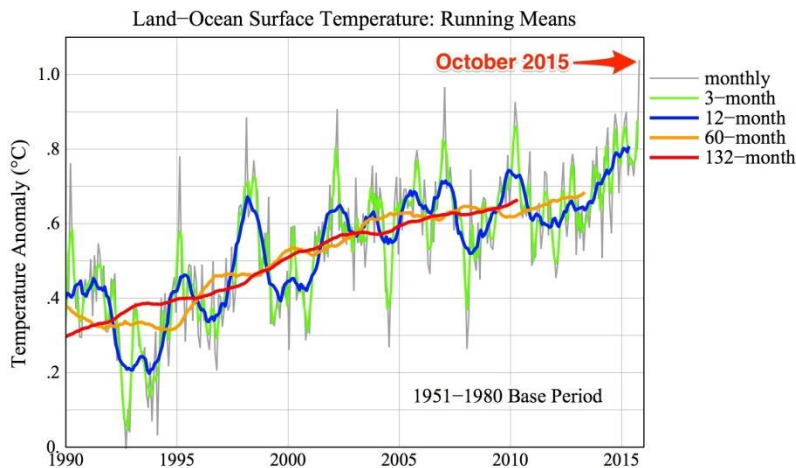


Source: CPC (USA)
http://www.cpc.ncep.noaa.gov/products/precip/CWlink/daily_ao_index/hgt.shtml

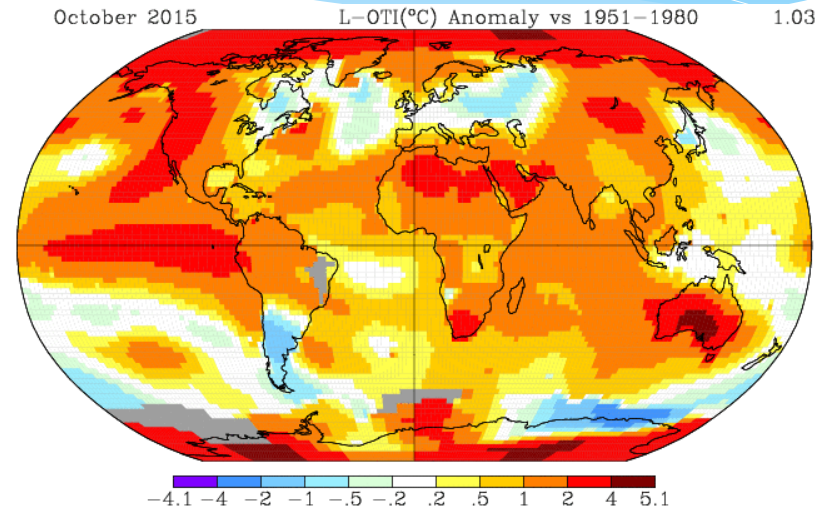
Source: NOAA
<http://www.esrl.noaa.gov/psd/data/correlation/qbo.data>

Strong polar vortex and westerly QBO are consistent with zonal circulation prevalence over the NH in winter (e.g. mild winter conditions over Europe).

Global warming



Source: NASA/Columbia University



Source: NASA GISS

2015 is virtually certain the hottest year in archives. 2016 is very likely to be in the top 10. What could tell us these information about the prospects for the winter 2015-2016 in the MedCOF region? Unfortunately, not very much. On this scales, natural variability is still stronger than the GHG-forced one.

Preliminary (tentative) conclusions

Phenomenon/Mechanism/factor	Atmospheric blocking events in Atlantic/European area	Zonal circulations	Stratospheric warmings	NAO phase	Shifts in the jet stream position/intensity over Atlantic/European area
Strong ENSO	perhaps enhanced in late winter		enhanced	perhaps negative in the late winter	yes
Positive NAT SST index				negative	yes
Cold blob in the North Atlantic					Northward over the Atlantic?
Positive AMO					
Positive PDO				less chances for negative NAO in the presence of ENSO	yes
May SST		enhanced		positive	Northward over Europe?
More snow cover extent in Eurasia	enhanced		?	negative	Southward over Europe?
Reduced Arctic sea ice concentration	enhanced			negative	yes
Strong polar vortex		enhanced (first part of the winter)		positive	Northward over Europe?
Westerly QBO		enhanced		positive	Northward over Europe?