MedCOF 9

SEASONAL FORECASTS FROM STATISTICAL SYSTEMS

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MedCOF-9

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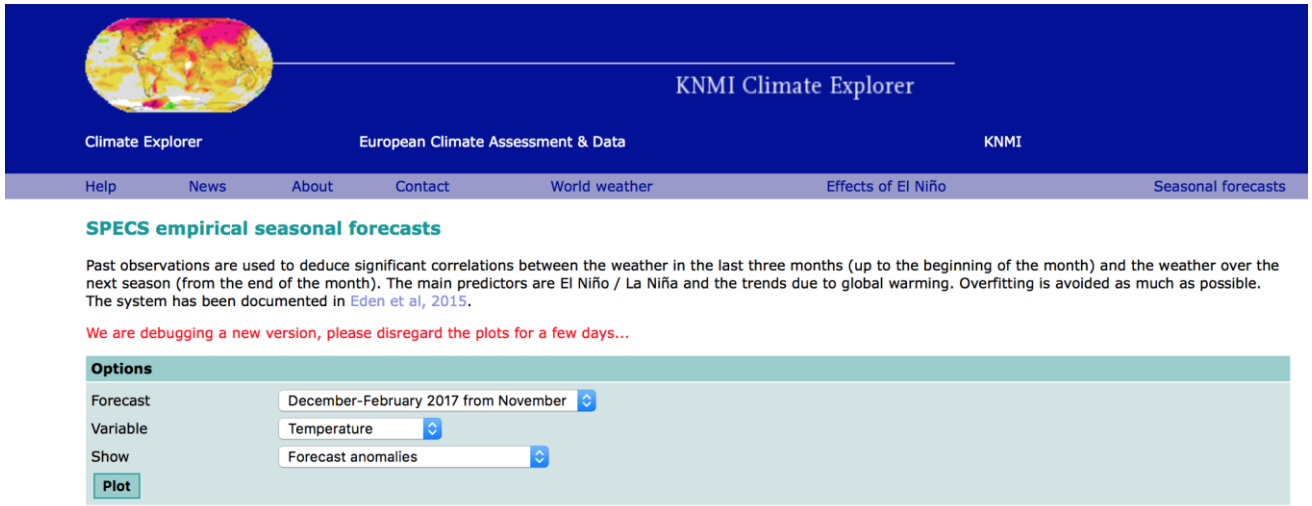
MedCOF 9

SPECS empirical seasonal forecasts

Past observations are used to deduce significant correlations between the weather in the last three months (up to the beginning of the month) and the weather over the next season (from the end of the month). The main predictors are El Niño / La Niña and the trends due to global warming. Overfitting is avoided as much as possible. The system has been documented in Eden et al, 2015 (under review).



SPECS

Seasonal-to-decadal climate Prediction for the improvement of European Climate Services

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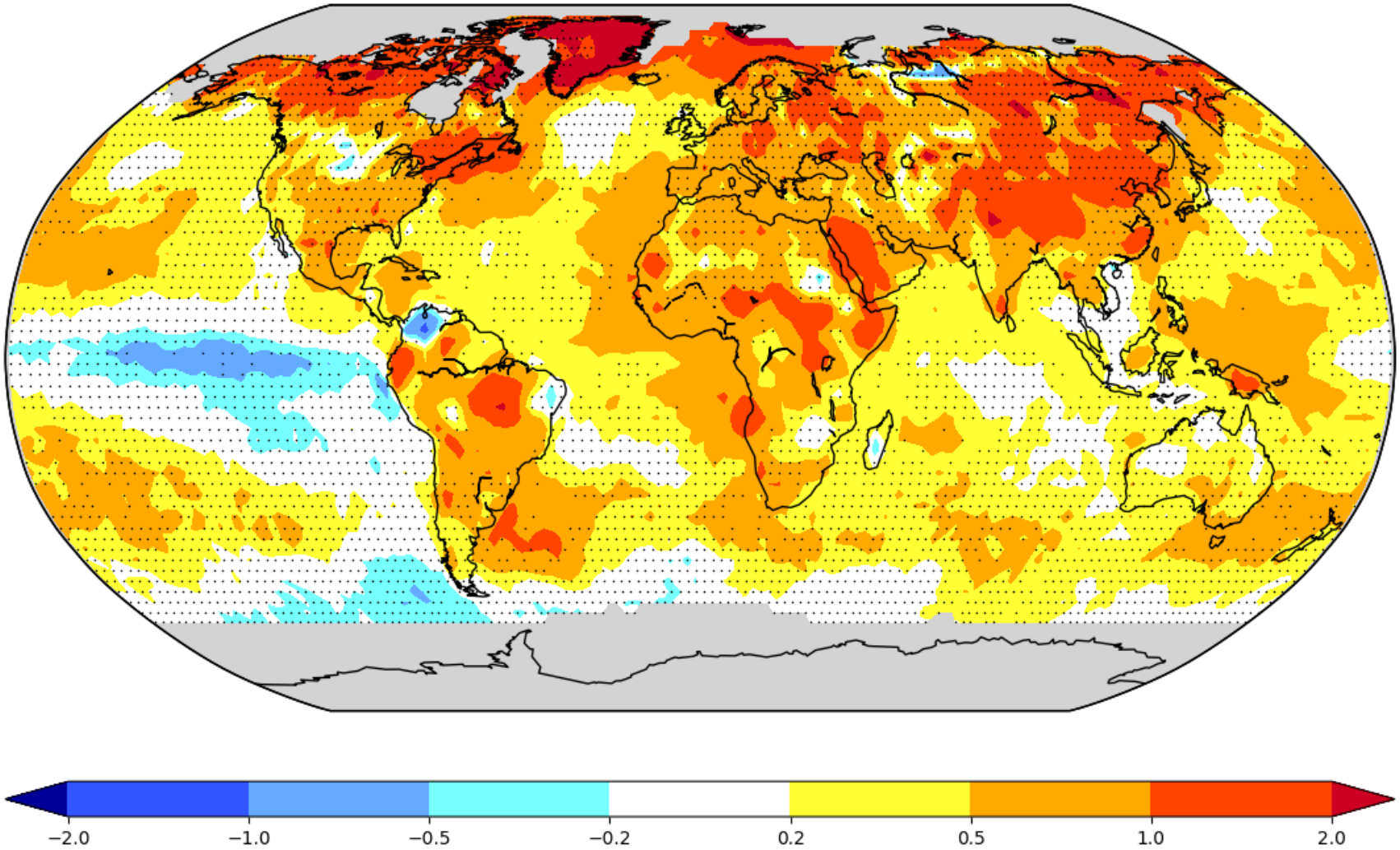
SPECS Empirical Seasonal Forecast: Surface air temperature (DJF 2017)

Ensemble mean anomaly (wrt 1980-2010)

Ensemble size: 51 | Forecast generation date: 15/11/2017 | Stippled where NOT significant at 10% level | base time: Nov 2017



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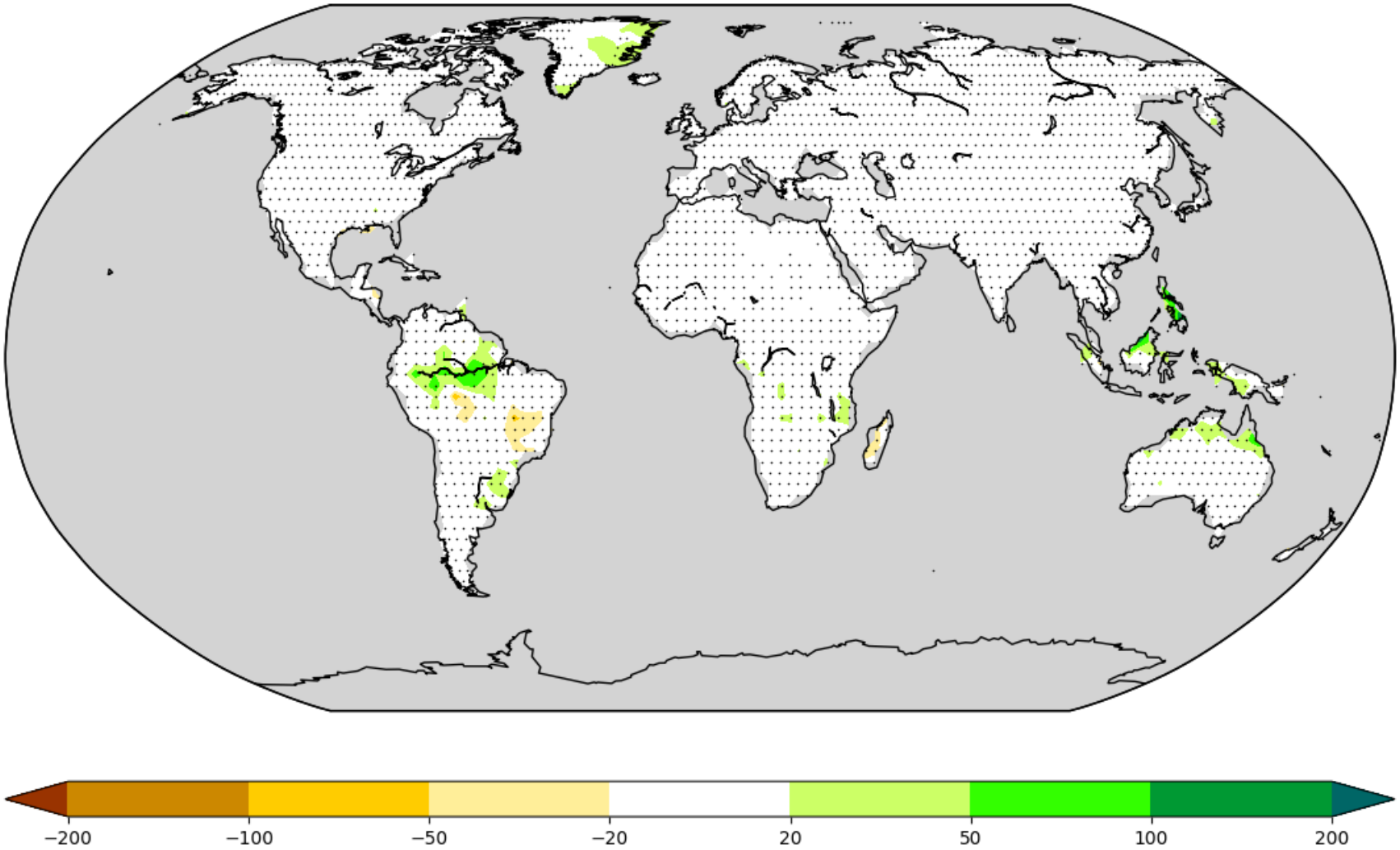
SPECS Empirical Seasonal Forecast: Surface precipitation (DJF 2017)

Ensemble mean anomaly (wrt 1980-2010)

Ensemble size: 51 | Forecast generation date: 15/11/2017 | Stippled where NOT significant at 10% level | base time: Nov 2017



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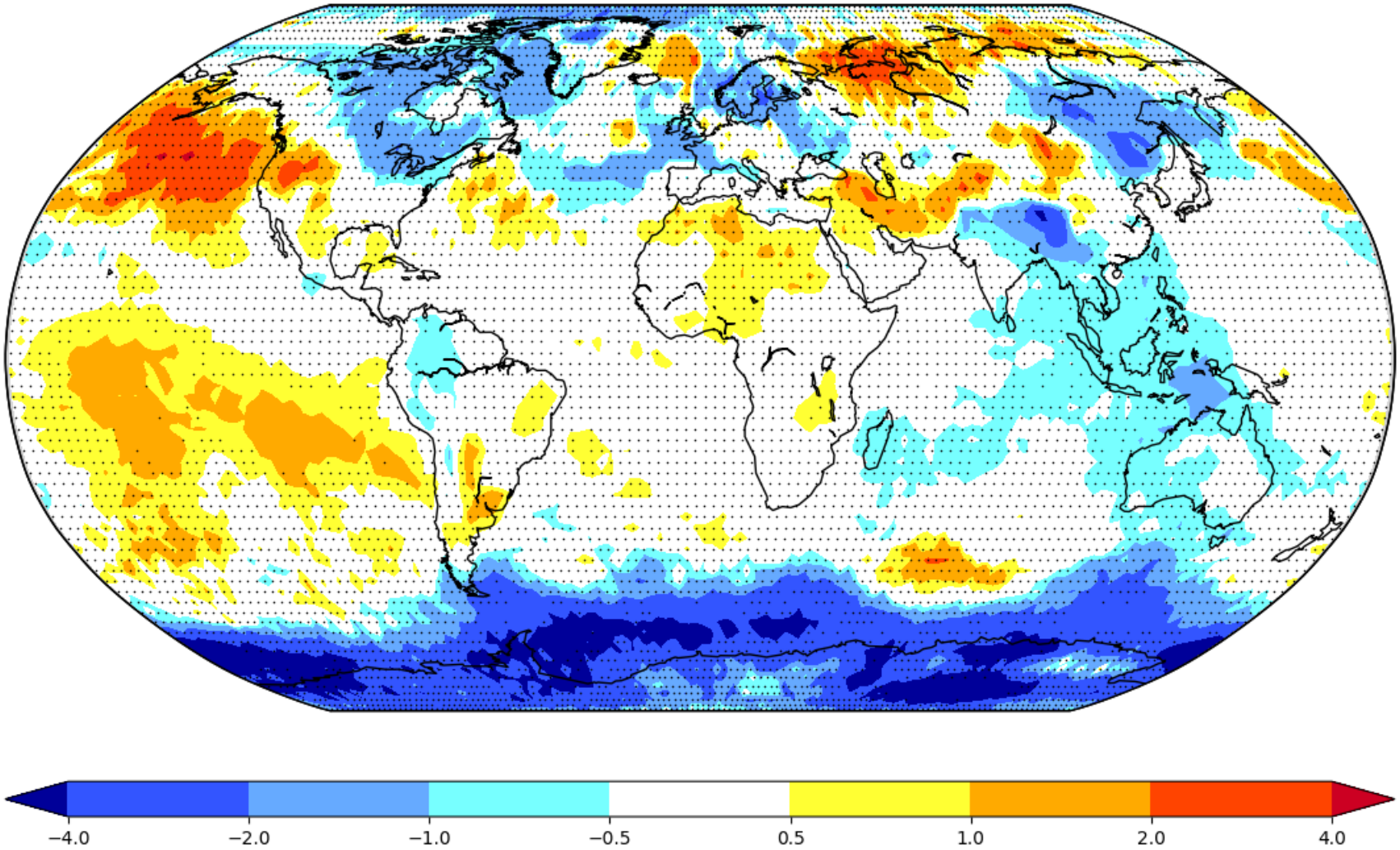
SPECS Empirical Seasonal Forecast: Mean sea level pressure (DJF 2017)

Ensemble mean anomaly (wrt 1980-2010)

Ensemble size: 51 | Forecast generation date: 15/11/2017 | Stippled where NOT significant at 10% level | base time: Nov 2017



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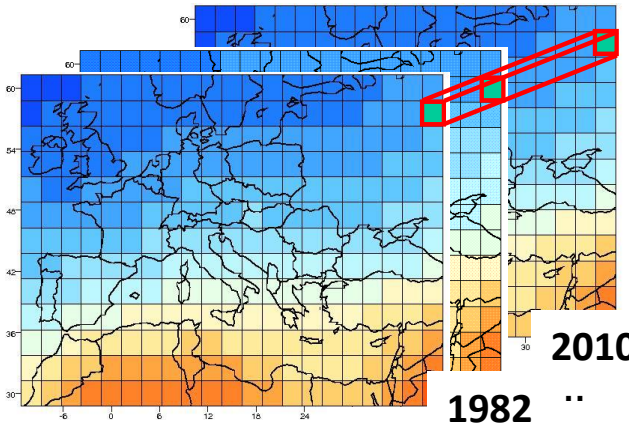
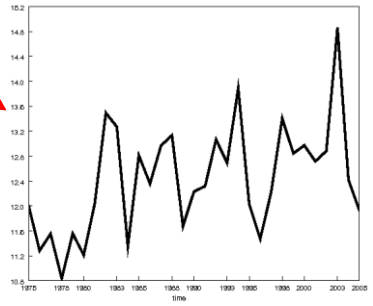
Predictand Matrix

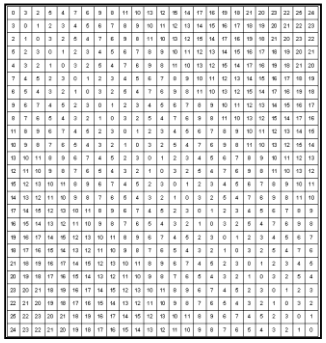


1981 1982 .. 2010



Predictand at location (x,y)

Predictors Matrix



Detrended

Multivariate Linear Regression

Forecast at (x,y) 5

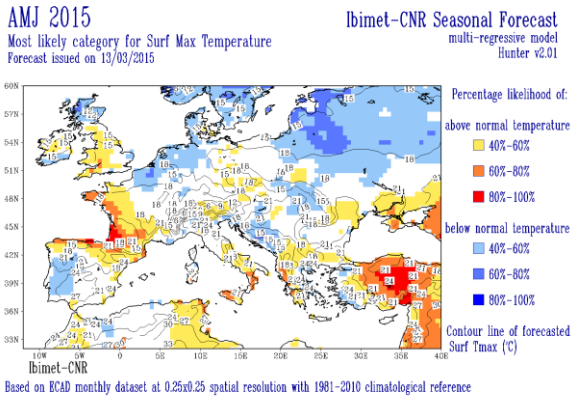


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Table S1: List of predictors

Short Name	Full Name	Source	Timescale
MED_1, MED_2	Mediterranean SST EOF1, EOF2 (JUNG ET AL., 2006)	IRI-DL	MONTHLY
GUI_1, GUI_2	Guinea Gulf SST EOF1, EOF2 (2)	IRI-DL	MONTHLY
IND_1, IND_2	Indian Ocean SST EOF1, EOF2(3)	IRI-DL	MONTHLY
AMO	Atlantic Multidecadal Oscillation (Enfield et al., 2001)	ESRL	QUARTERLY
TRI	Atlantic Tripole (Deser & Timlin, 1997)	IRI-DL	QUARTERLY
MEI	Multivariate ENSO Index (Wolter & Timlin, 1993)	ESRL	QUARTERLY
NAO	North Atlantic Oscillation (Barnston and Livezey, 1987)	CPC	MONTHLY
MZI	Modified Zonal Index (J. P. Li & Wang, 2003)	IRI-DL	MONTHLY
PDO	Pacific Decadal Oscillation (Mantua et al., 1997)	JISAO	MONTHLY
PNA	Pacific/North American pattern (Barnston and Livezey, 1997)	IRI-DL	MONTHLY
QBO	Quasi-Biennial Oscillation at 30hPa (Baldwin, et al. 2001)	Fu-Berlin	MONTHLY
AO	Arctic Oscillation	CPC	MONTHLY
NAM_1, NAM_2	Geopotential Height 70N - 90N / 1000hPa - 1 hPa EOF1, EOF2	IRI-DL	MONTHLY
SSNOW_1, SSNOW_2	EURASIAN SNOW COVER EOF1, EOF2	IRI-DL	MONTHLY

Sources
Fu-Berlin: http://www.geo.fu-berlin.de/en/met/ag/strat/produkte/qbo/
JISAO: http://jisao.washington.edu/pdo/
IRI-DL: http://iridl.ldeo.columbia.edu
Mie-Univ: http://www.bio.mie-u.ac.jp/kankyo/shizen/lab1/AOindex.htm
ESRL: http://www.esrl.noaa.gov/psd/data/timeseries/AMO/
CPC: http://www.cpc.ncep.noaa.gov/products/precip/CWlink/daily_ao_index/teleconnections.shtml

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Predictors selection

Forecast issue time / Predictor reference time	IND_1	IND_2	AO	MZI	PDO	AMO	NAM_1	NAM_2	SSNOW_1	SSNOW_2	MEI	NA_2	NA_3	MED_1	MED_2	GUI_1	GUI_2	STA	NTA
November	10		10			10	10	10	10			10		10		10		10	10
December	11		11			11	11	11	11			11		11		11		11	11
January	x\	12	12	12	12	12	12	12	10	10	12	12	11					12	12
February	1	1	1	1	1	1	1	1	10	10	1	1	12					1	1
March	2	2	2	2	2	1	2	2	10	10	2	2	1					2	2
April	3	3	3	3	3	2	2	2	10	10	3	3	2					3	3
May	4	4	4	4	4	3	2	2			4	4	3	4	4			4	4
June	5	5	5	5	5	4	3	3			5	5	4	5	5	5	5	5	5

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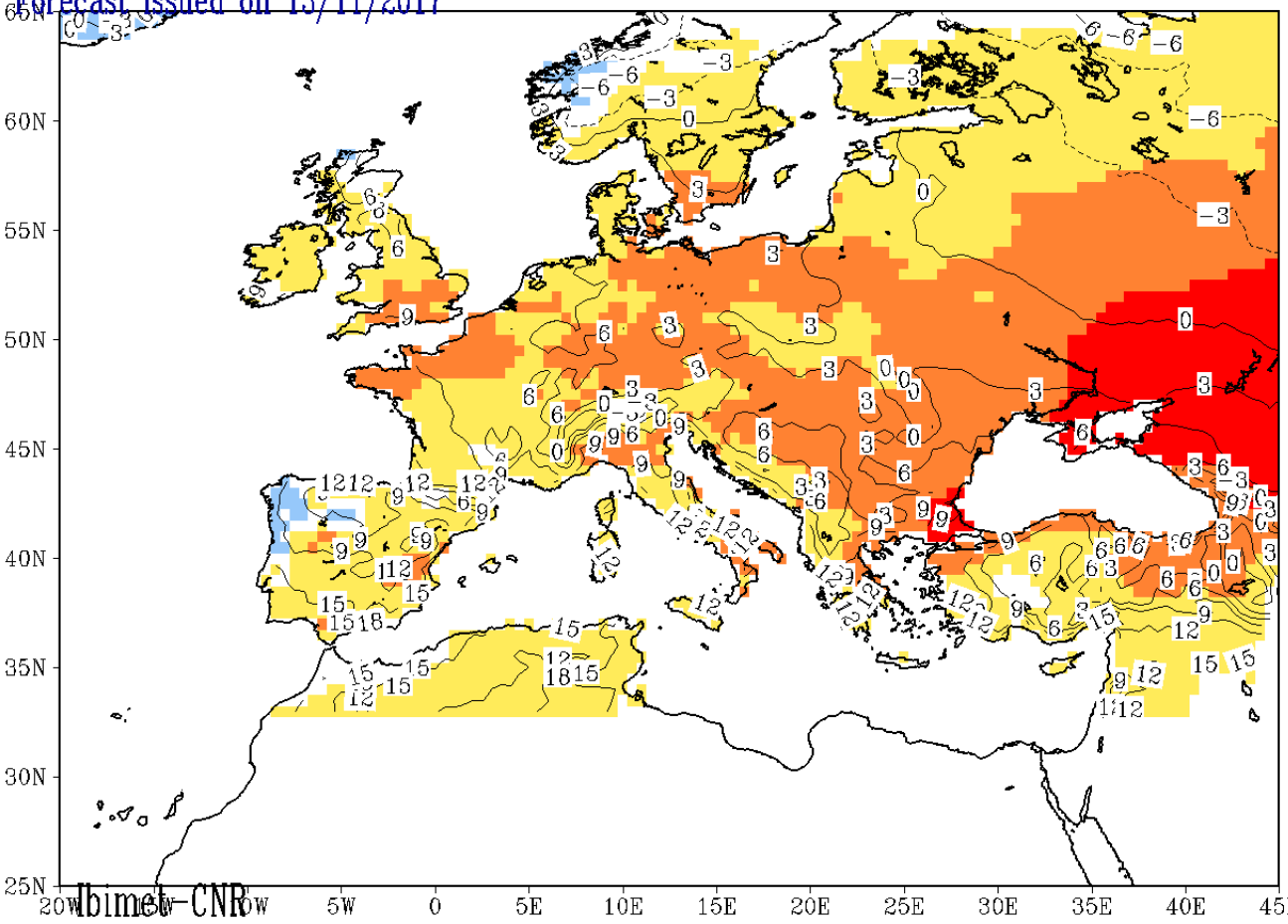
DJF 2018

Most likely category for Surf Max Temperature

Forecast issued on 13/11/2017

Ibimet-CNR Seasonal Forecast

multi-regressive model
Hunter v2.01



Percentage likelihood of:

above normal temperature

- 40%-60%
- 60%-80%
- 80%-100%

below normal temperature

- 40%-60%
- 60%-80%
- 80%-100%

Contour line of forecasted Surf Tmax (°C)

Based on ECAD monthly dataset at 0.25x0.25 spatial resolution with 1981-2010 climatological reference

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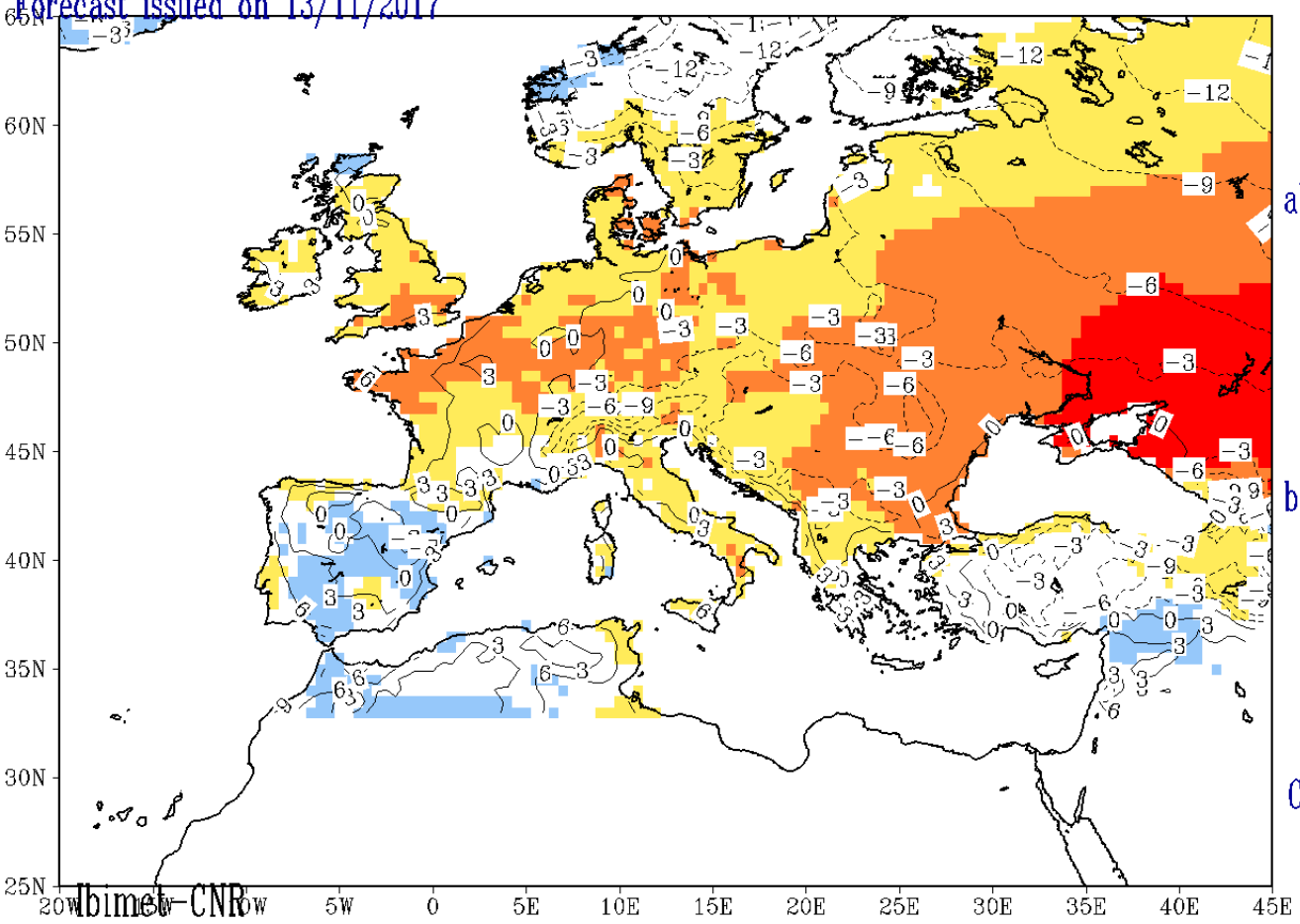
DJF 2018

Most likely category for Surf Min Temperature

Forecast issued on 13/11/2017

Ibimet-CNR Seasonal Forecast

multi-regressive model
Hunter v2.01



Percentage likelihood of:

above normal temperature

- 40%-60%
- 60%-80%
- 80%-100%

below normal temperature

- 40%-60%
- 60%-80%
- 80%-100%

Contour line of forecasted

Based on ECAD monthly dataset at 0.25x0.25 spatial resolution with 1981-2010 climatological reference

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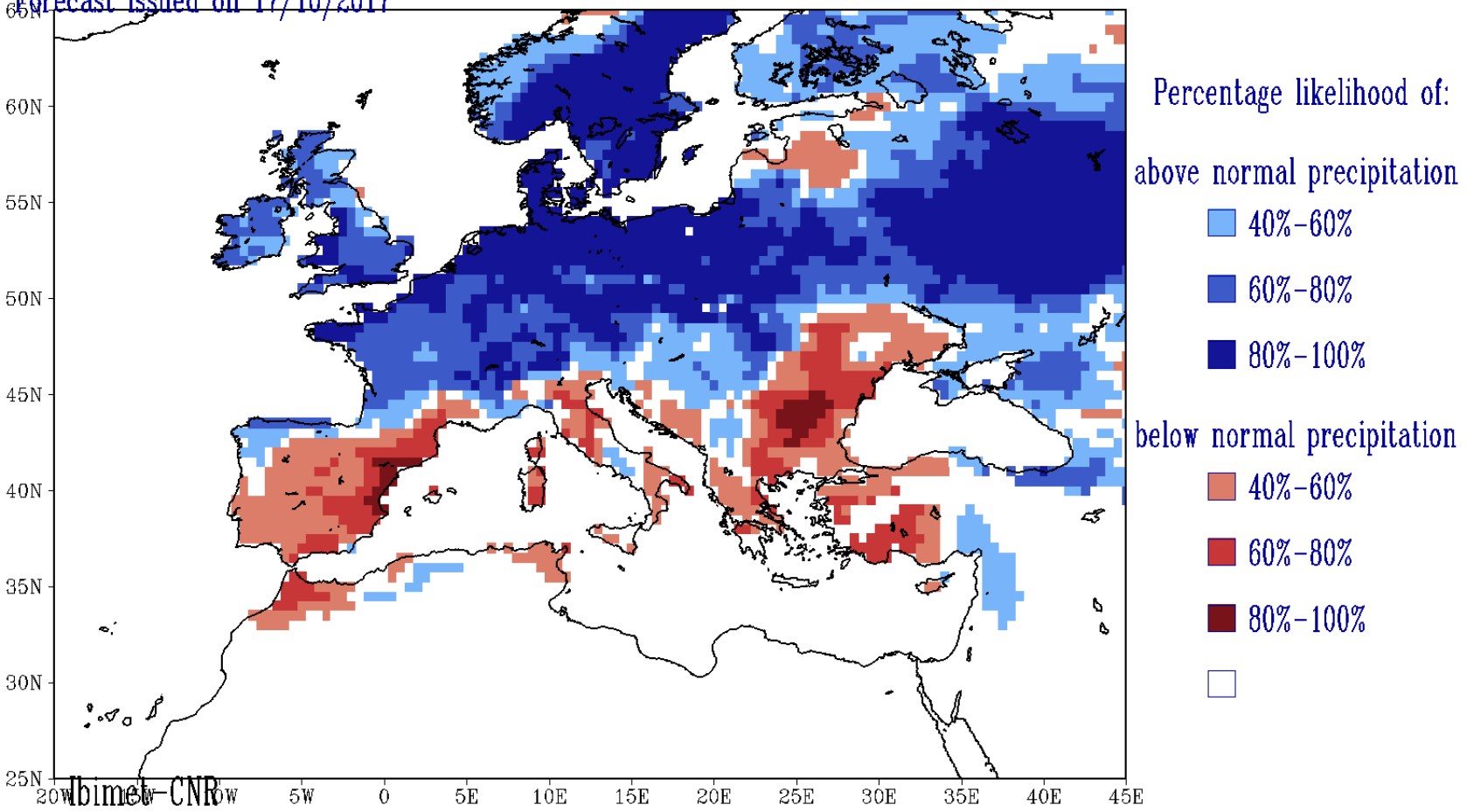
DJF 2018

Most likely category for 1-month precip ECAD-EOBS

Forecast issued on 17/10/2017

Ibimet-CNR Seasonal Forecast

multi-regressive model
Hunter v2.01



Percentage likelihood of:

above normal precipitation

- 40%-60%
- 60%-80%
- 80%-100%

below normal precipitation

- 40%-60%
- 60%-80%
- 80%-100%

Based on ECAD monthly dataset at 0.25x0.25 spatial resolution with 1981-2010 climatological reference

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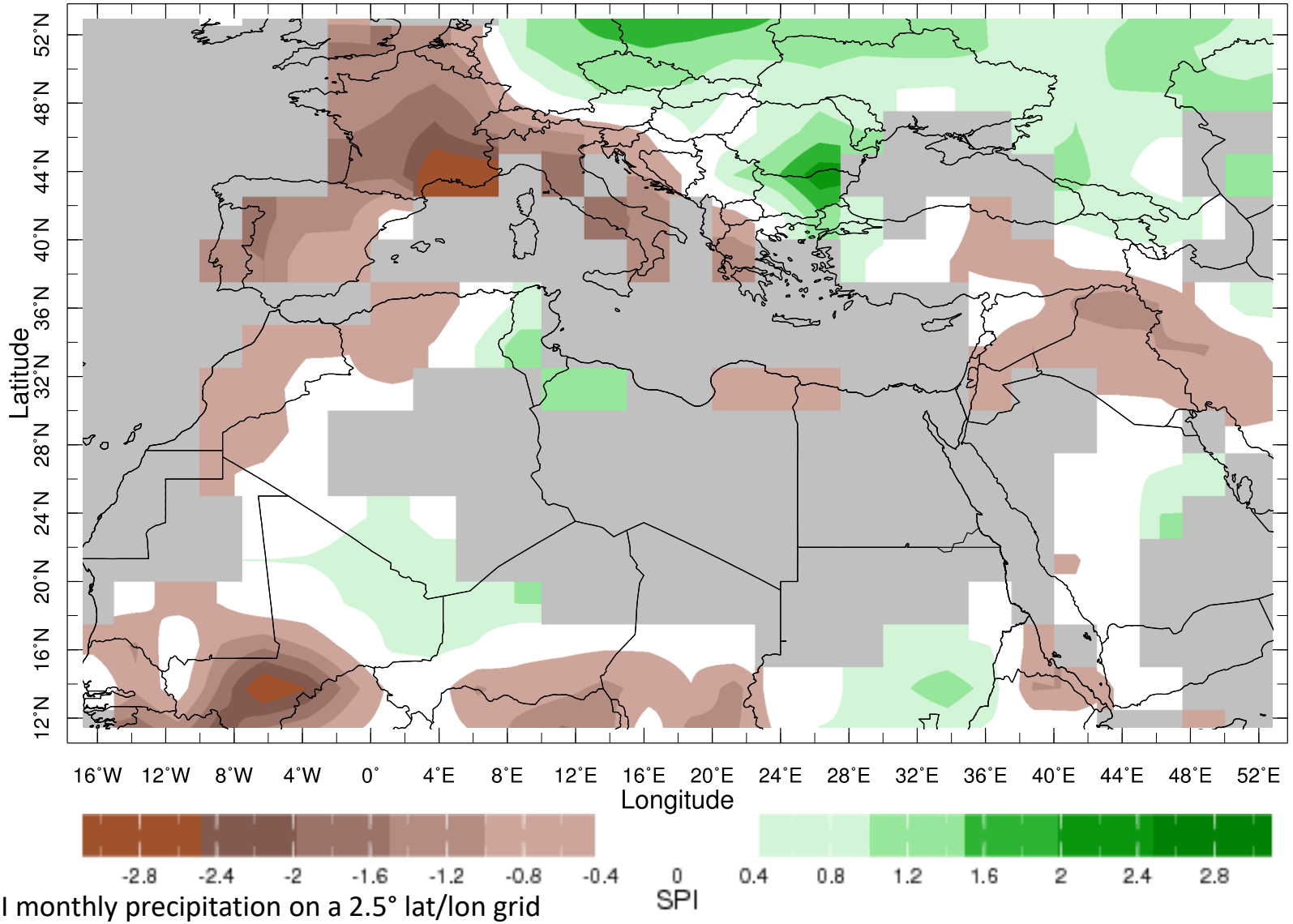
IRI/LDEO
Climate Data Library

SPI 1



Based on CAMS_OPI monthly precipitation on a 2.5° lat/lon grid

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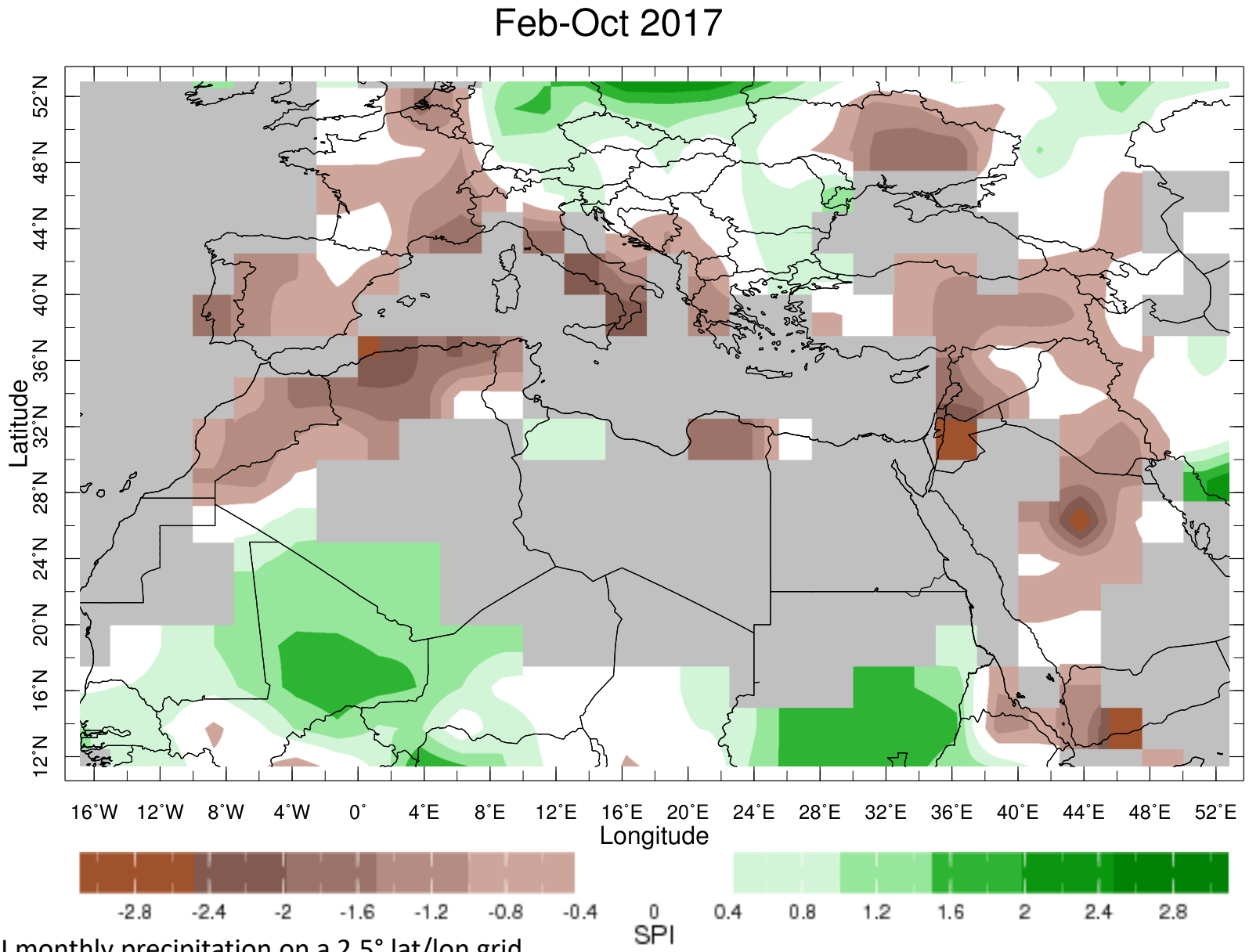
IRI/LDEO
Climate Data Library

SPI 9



Based on CAMS_OPI monthly precipitation on a 2.5° lat/lon grid

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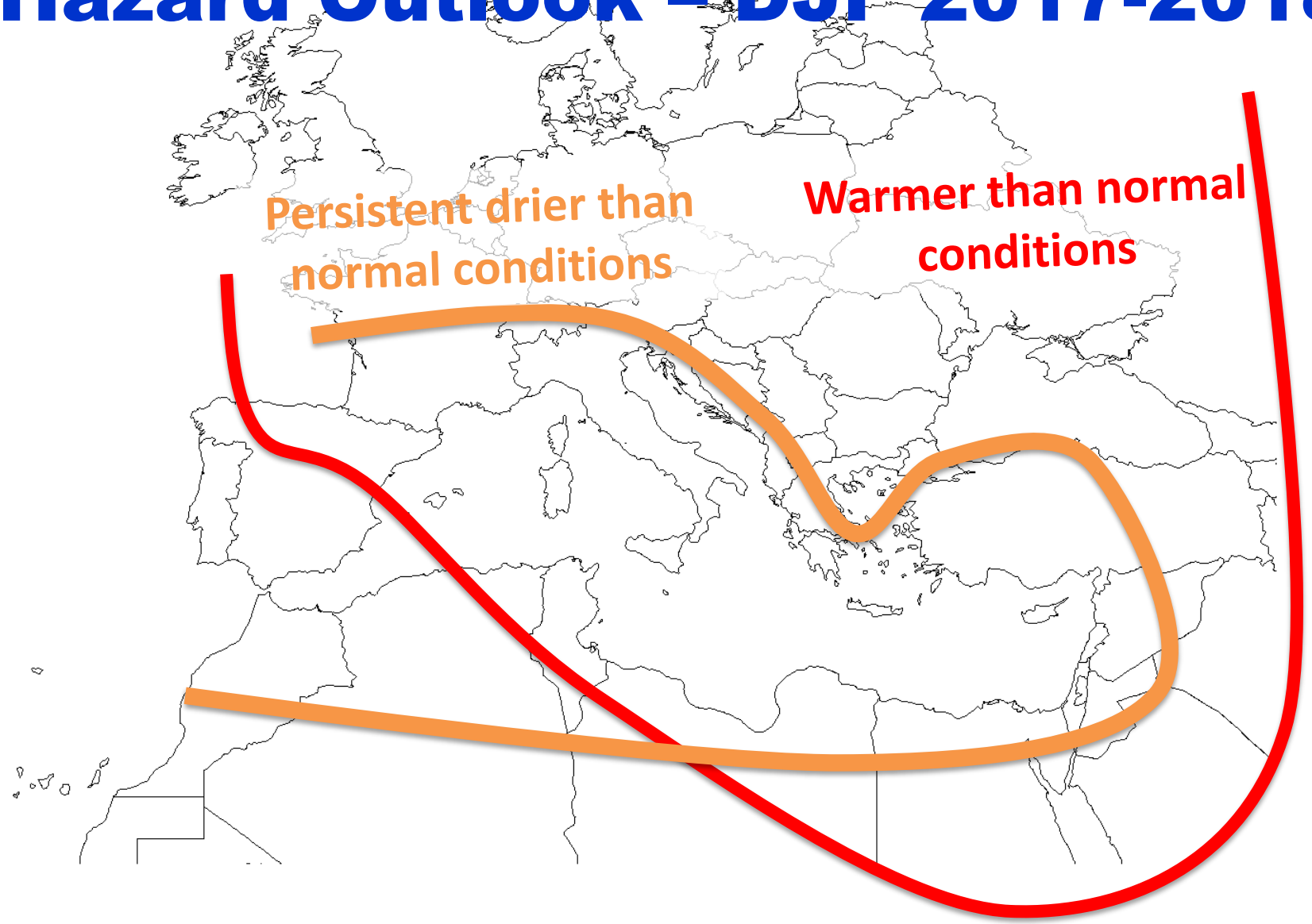
Hazard Outlook – DJF 2017-2018



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- A coherent signal of higher than normal temperature is present over a large part spanning from Central to Eastern Europe and Central to Eastern Mediterranean basin.

- Drier than normal conditions signal are expected over the Mediterranean. It is essentially super-imposed onto regions where drought is already present since early this year.

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Thank you!!