



Climate Change

Forecast

December 2018 – February 2019

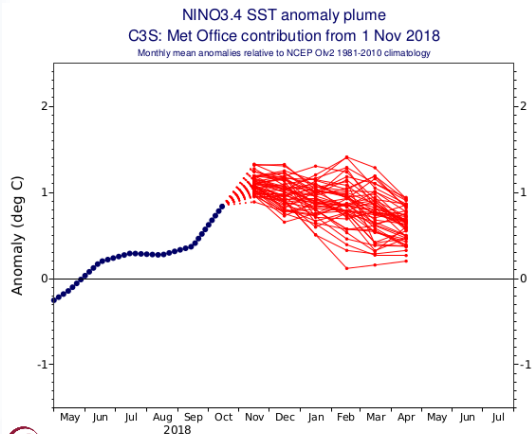
MedCOF November 2018



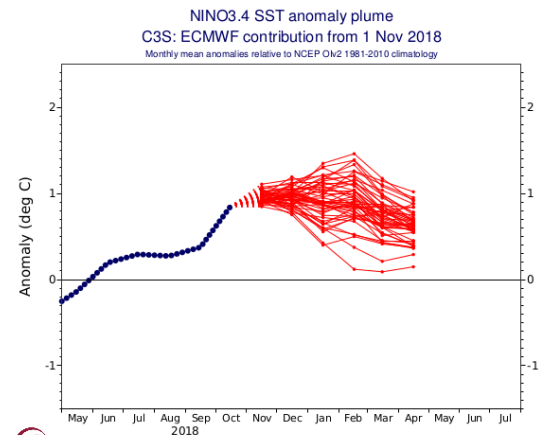


Climate Change

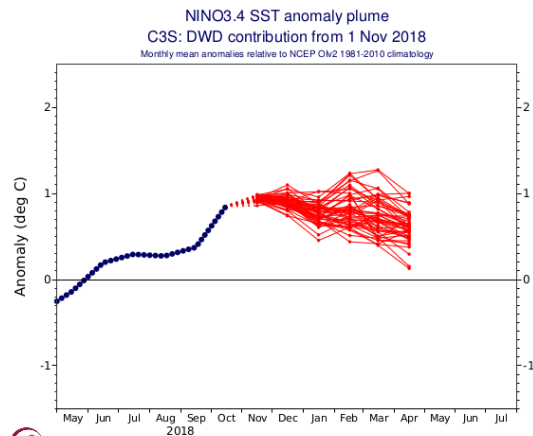
NINO 3.4 - from November 2018



UKMO



ECMWF



DWD

UKMO: GPC Exeter
DWD: GPC Offenbach

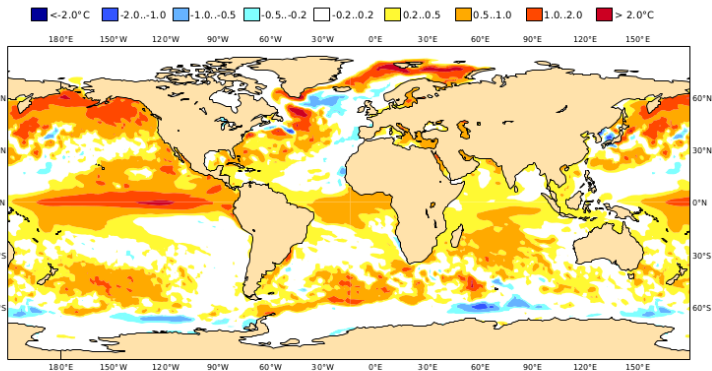


Climate Change

SST-DJF from November 2018

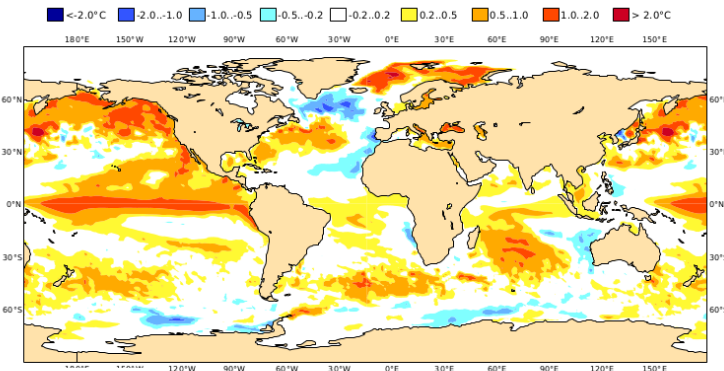
C3S: Met Office contribution
Mean forecast SST anomaly
Nominal forecast start: 01/11/18
Ensemble size = 50, climate size = 672

DJF 2018/19



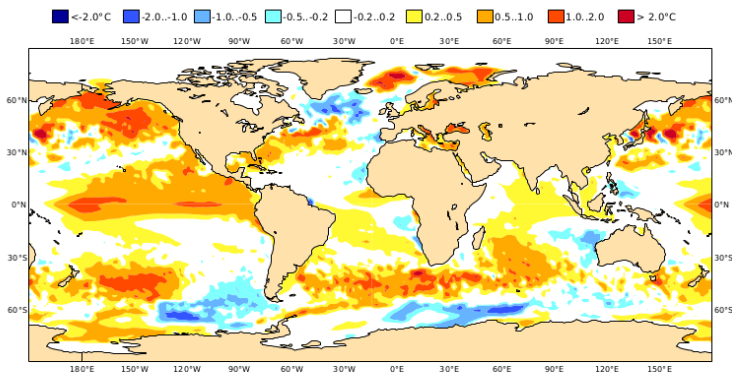
C3S: ECMWF contribution
Mean forecast SST anomaly
Nominal forecast start: 01/11/18
Ensemble size = 51, climate size = 600

DJF 2018/19



C3S: DWD contribution
Mean forecast SST anomaly
Nominal forecast start: 01/11/19
Ensemble size = 50, climate size = 720

DJF 2018/19



UKMO

ECMWF

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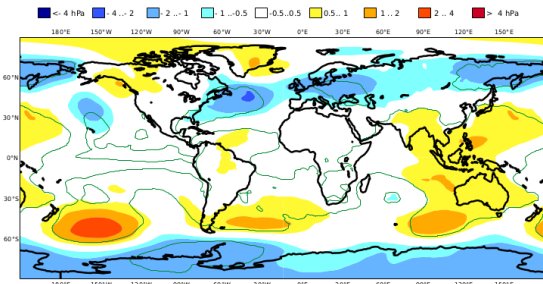
Climate Change

MSLP - DJF from November 2018

C3S: Met Office contribution
Mean MSLP anomaly
Nominal forecast start: 01/11/18
Ensemble size = 50, climate size = 672

UKMO

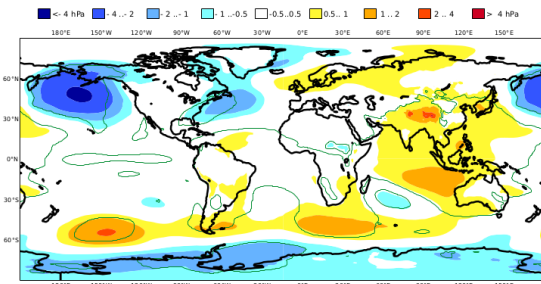
DJF 2018/19
Solid contour at 1% significance level



C3S: ECMWF contribution
Mean MSLP anomaly
Nominal forecast start: 01/11/18
Ensemble size = 51, climate size = 600

ECMWF

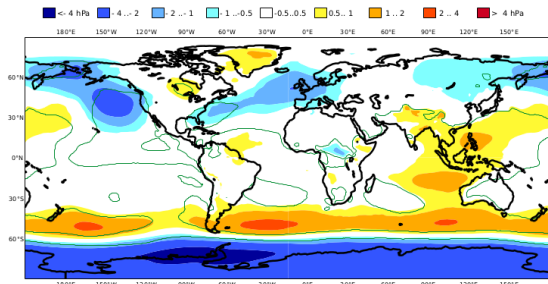
DJF 2018/19
Solid contour at 1% significance level



C3S: DWD contribution
Mean MSLP anomaly
Nominal forecast start: 01/11/18
Ensemble size = 50, climate size = 720

DWD

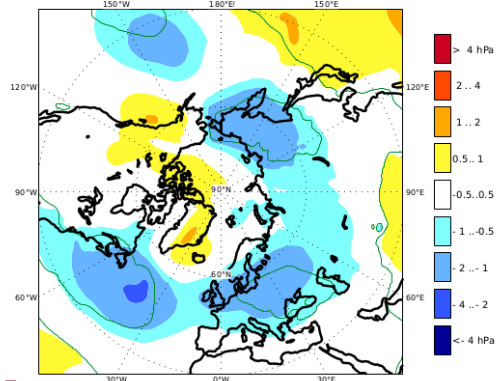
DJF 2018/19
Solid contour at 1% significance level



C3S: Met Office contribution
Mean MSLP anomaly
Nominal forecast start: 01/11/18
Ensemble size = 50, climate size = 672

UKMO

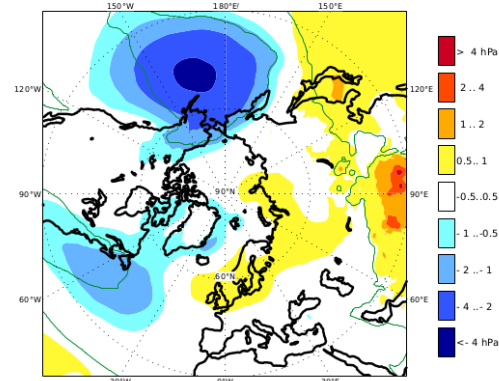
DJF 2018/19
Solid contour at 1% significance level



C3S: ECMWF contribution
Mean MSLP anomaly
Nominal forecast start: 01/11/18
Ensemble size = 51, climate size = 600

ECMWF

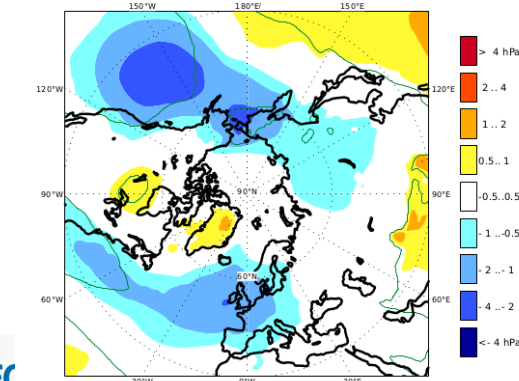
DJF 2018/19
Solid contour at 1% significance level



C3S: DWD contribution
Mean MSLP anomaly
Nominal forecast start: 01/11/18
Ensemble size = 50, climate size = 720

DWD

DJF 2018/19
Solid contour at 1% significance level



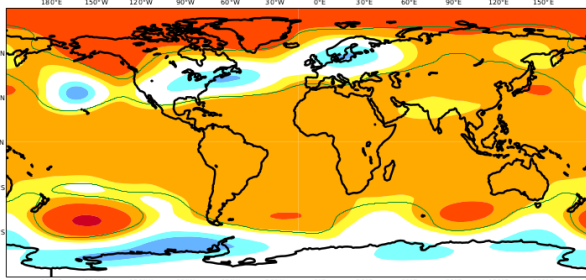
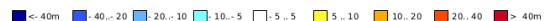


Z500-DJF from November 2018

C3S: Met Office contribution
Mean Z500 anomaly
Nominal forecast start: 01/11/18
Ensemble size = 50, climate size = 672

UKMO

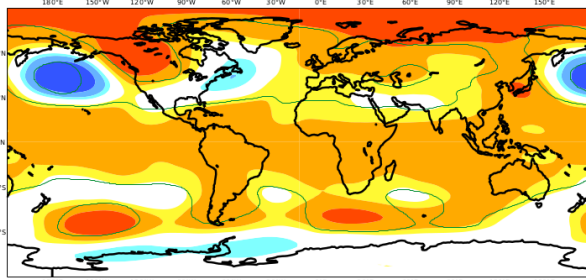
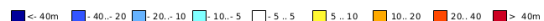
DJF 2018/19
Solid contour at 1% significance level



C3S: ECMWF contribution
Mean Z500 anomaly
Nominal forecast start: 01/11/18
Ensemble size = 51, climate size = 600

ECMWF

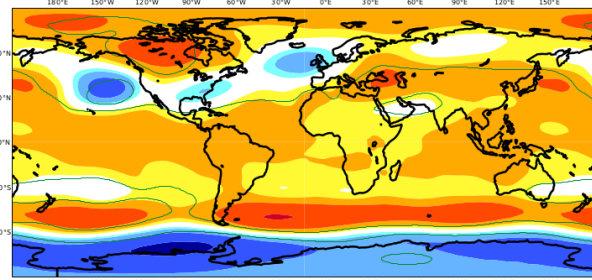
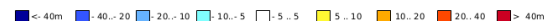
DJF 2018/19
Solid contour at 1% significance level



C3S: DWD contribution
Mean Z500 anomaly
Nominal forecast start: 01/11/18
Ensemble size = 50, climate size = 720

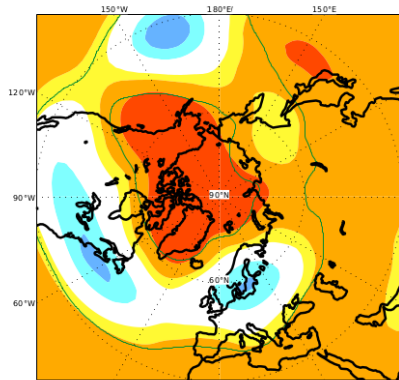
DWD

DJF 2018/19
Solid contour at 1% significance level



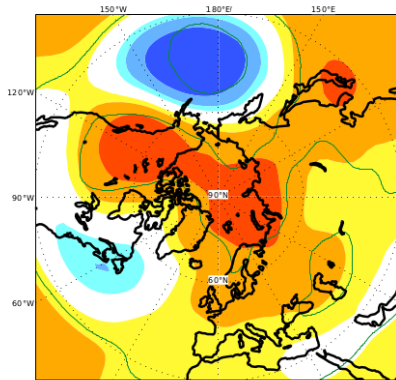
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DJF 2018/19
Solid contour at 1% significance level



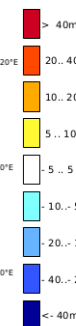
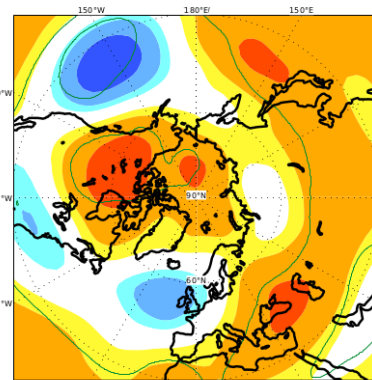
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DJF 2018/19
Solid contour at 1% significance level



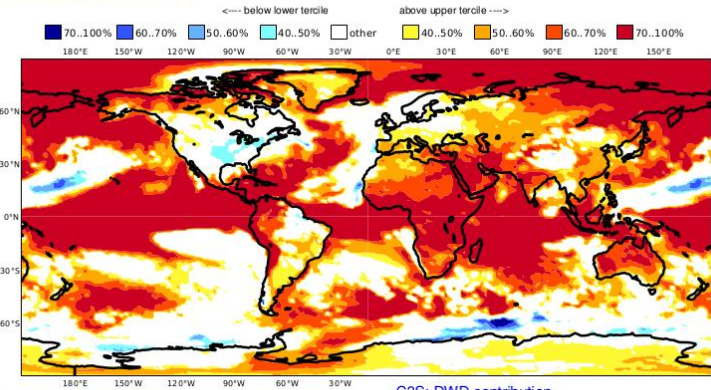


Climate Change

T2m - DJF from November 2018

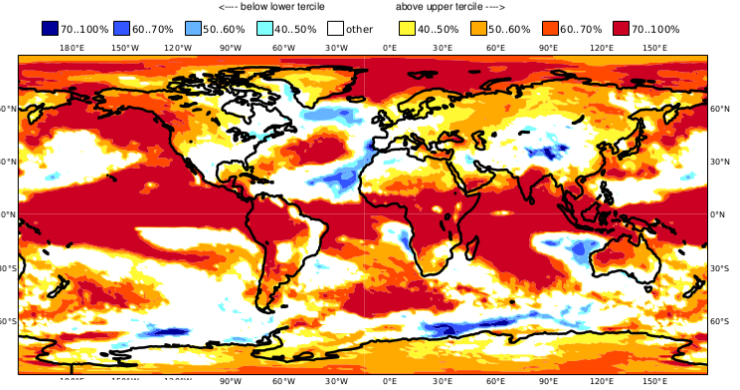
C3S: Met Office contribution
Prob(most likely category of 2m temperature)
Nominal forecast start: 01/11/18
Ensemble size = 50, climate size = 672

UKMO DJF 2018/19



C3S: ECMWF contribution
Prob(most likely category of 2m temperature)
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Ensemble size = 51, climate size = 600

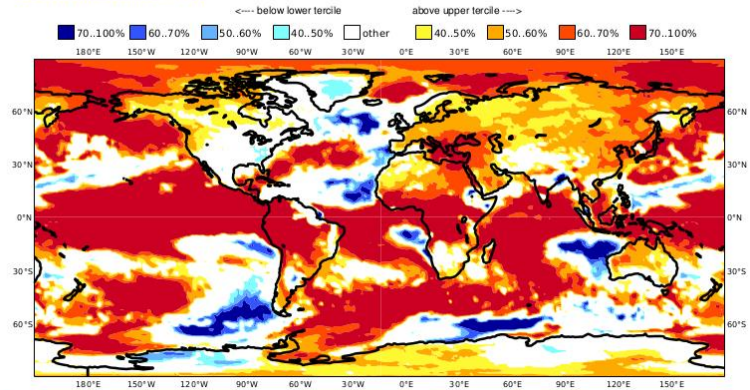
ECMWF DJF 2018/19



C3S: DWD contribution
Prob(most likely category of 2m temperature)
Nominal forecast start: 01/11/18
Ensemble size = 50, climate size = 720

DJF 2018/19

DWD





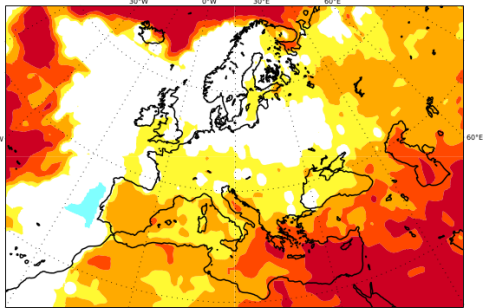
T2m - DJF from November 2018

Climate

UKMO

C3S: Met Office contribution
Prob(most likely category of 2m temperature)
Nominal forecast start: 01/11/18
Ensemble size = 50, climate size = 672

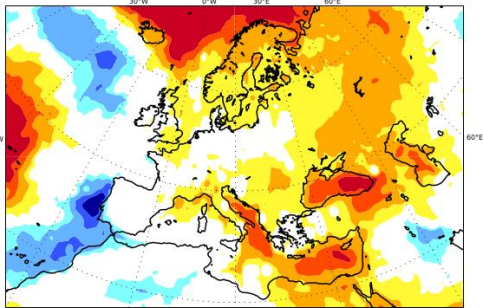
DJF 2018/19



ECMWF

C3S: ECMWF contribution
Prob(most likely category of 2m temperature)
Nominal forecast start: 01/11/18
Ensemble size = 51, climate size = 600

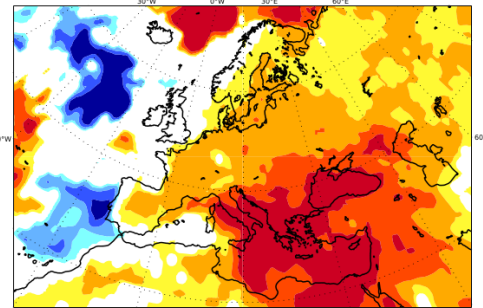
DJF 2018/19



DWD

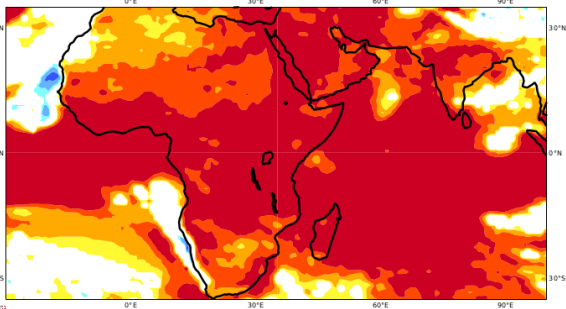
DWD contribution
Prob(most likely category of 2m temperature)
Nominal forecast start: 01/11/18
Ensemble size = 50, climate size = 720

DJF 2018/19



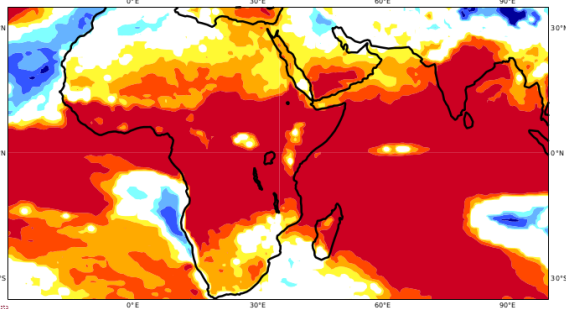
C3S: Met Office contribution
Prob(most likely category of 2m temperature)
Nominal forecast start: 01/11/18
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DJF 2018/19



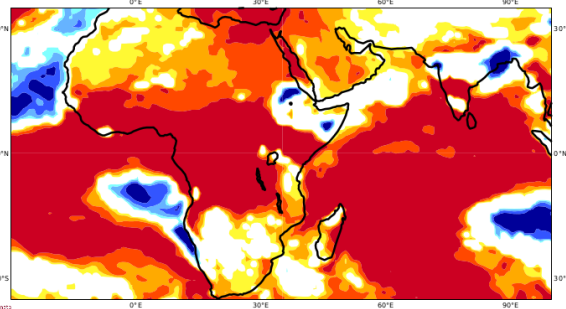
C3S: ECMWF contribution
Prob(most likely category of 2m temperature)
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Ensemble size = 51, climate size = 600

DJF 2018/19



C3S: DWD contribution
Prob(most likely category of 2m temperature)
Nominal forecast start: 01/11/18
Ensemble size = 50, climate size = 720

DJF 2018/19





Climate Change

Precipitation - DJF from November 2018

C3S: Met Office contribution

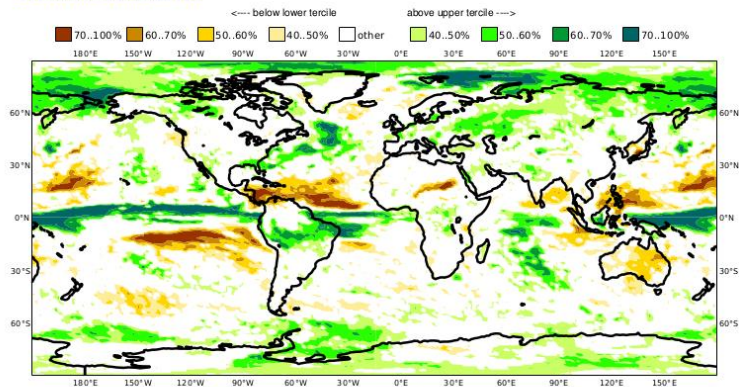
Prob(most likely category of precipitation)

Nominal forecast start: 01/11/18

Ensemble size = 50, climate size = 672

UKMO

DJF 2018/19



C3S: ECMWF contribution

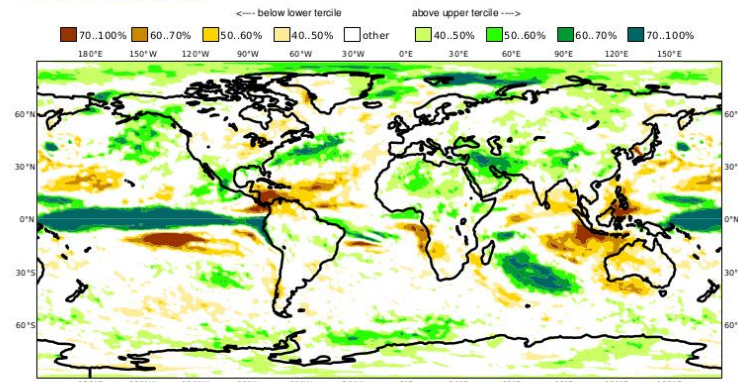
Prob(most likely category of precipitation)

Nominal forecast start: 01/11/18

Ensemble size = 51, climate size = 600

ECMWF

DJF 2018/19



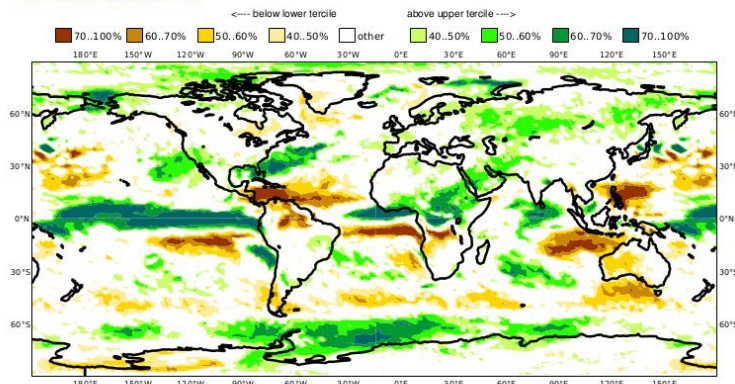
C3S: DWD contribution

Prob(most likely category of precipitation)

Nominal forecast start: 01/11/18

Ensemble size = 50, climate size = 720

DWD



DJF 2018/19





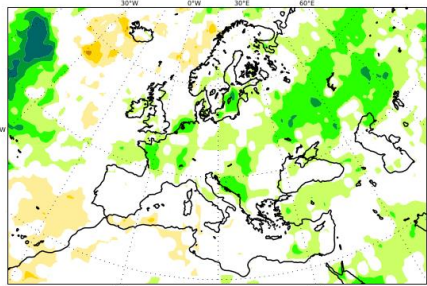
Precipitation - DJF from November 2018

Climate Change

C3S: Met Office contribution
Prob(most likely category of precipitation)
Nominal forecast start: 01/11/18
Ensemble size = 50, climate size = 672

UKMO

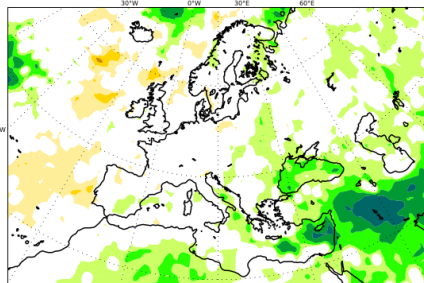
DJF 2018/19



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Ensemble size = 51, climate size = 600

ECMWF

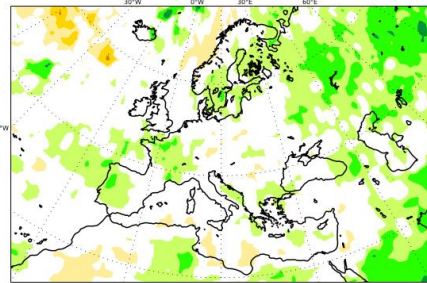
DJF 2018/19



C3S: DWD contribution
Prob(most likely category of precipitation)
Nominal forecast start: 01/11/18
Ensemble size = 50, climate size = 720

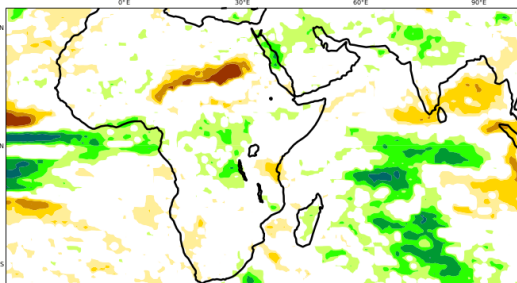
DWD

DJF 2018/19



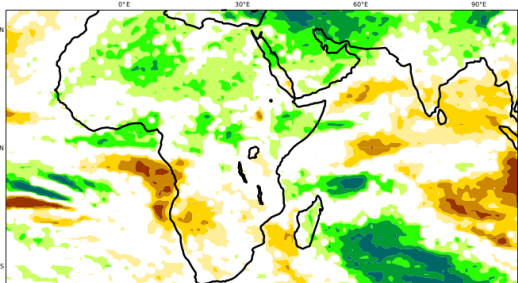
C3S: Met Office contribution
Prob(most likely category of precipitation)
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DJF 2018/19



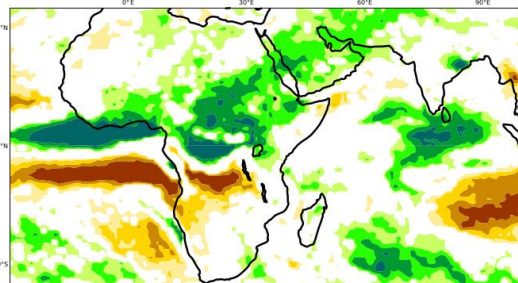
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DJF 2018/19



C3S: DWD contribution
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Ensemble size = 50, climate size = 720

DJF 2018/19





Climate
Change



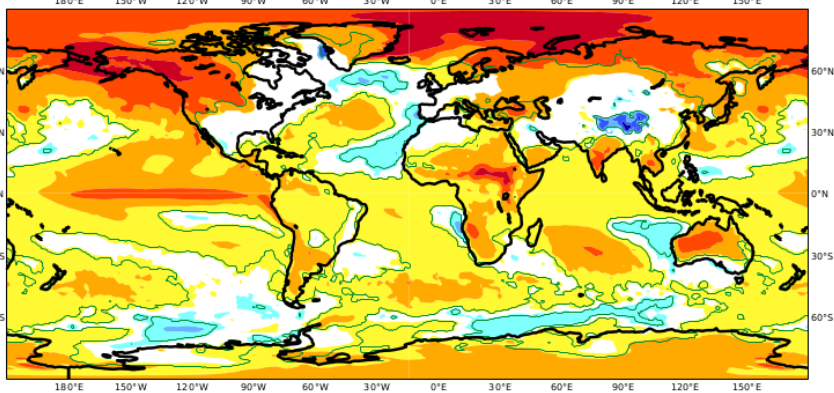
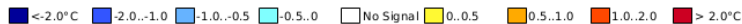
Skill



Ensemble mean - DJF from November 2018

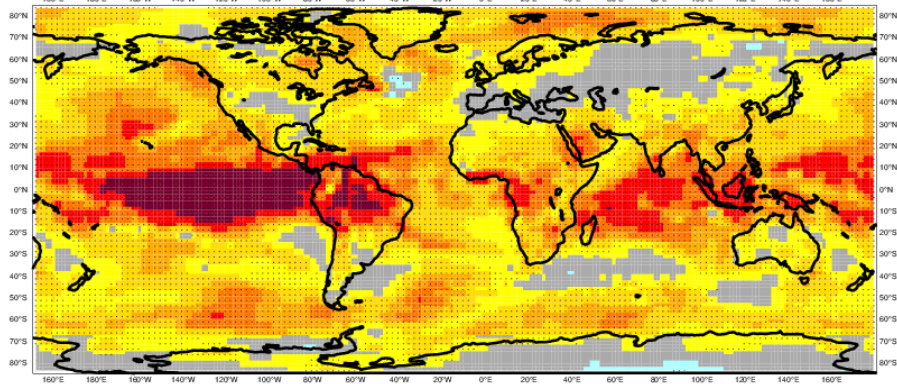
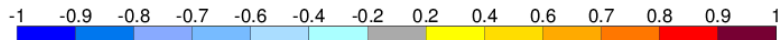
C3S: ECMWF contribution
Mean 2m temperature anomaly
Nominal forecast start: 01/11/18
Ensemble size = 51, climate size = 600

DJF 2018/19
Shaded areas significant at 10% level
Solid contour at 1% level



Anomaly correlation - DJF from November

Anomaly Correlation Coefficient for 0001 with 25 ensemble members
Near-surface air temperature
Hindcast period 1981-2016 with start in November average over months 2 to 4
Black dots for values significantly different from zero with 95% confidence (1000 samples)





Climate
Change

T 2 m - D W D

Ensemble mean - DJF from November 2018

C3S: DWD contribution

Mean 2m temperature anomaly

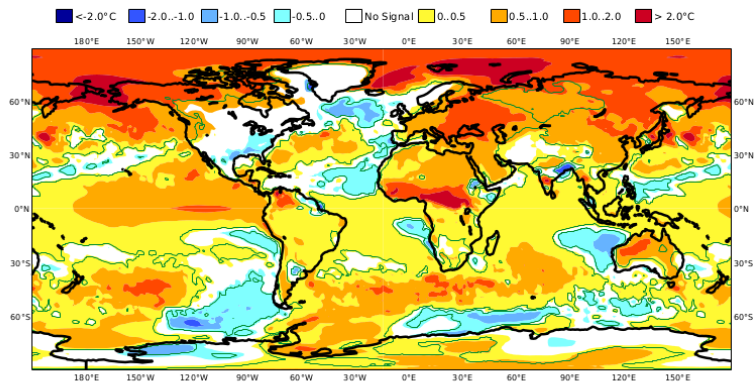
Nominal forecast start: 01/11/18

Ensemble size = 50, climate size = 720

DJF 2018/19

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Anomaly correlation - DJF from November

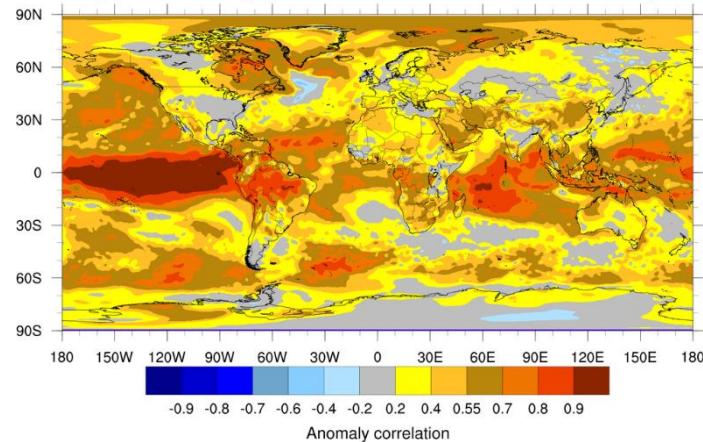
Anomaly correlation

Temperature in 2m height

GCFS2 1990-2018

DecJanFeb (month 2-4)

start at 01/11 each year



© DWD, MPI-M, UHH: generated on 2018-10-31



Climate Change

T 2 m - U K M O

ROC area DJF from November

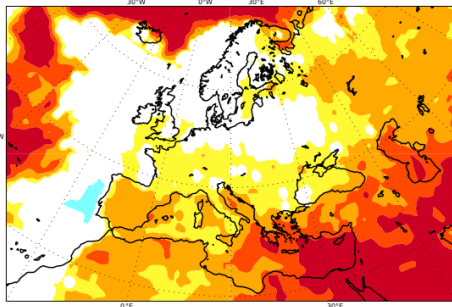
C3S: Met Office contribution

Prob(most likely category of 2m temperature)

Nominal forecast start: 01/11/18

Ensemble size = 50, climate size = 672

DJF 2018/19



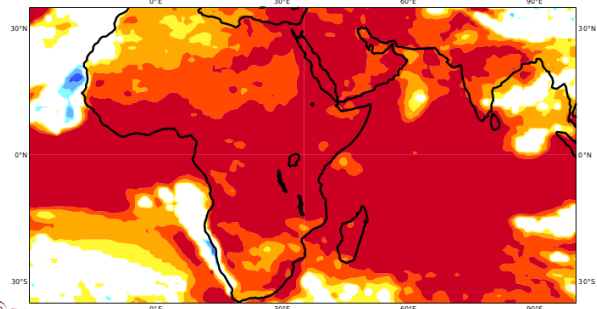
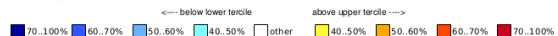
C3S: Met Office contribution

Prob(most likely category of 2m temperature)

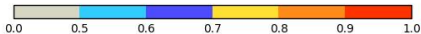
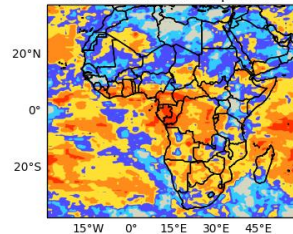
Nominal forecast start: 01/11/18

Ensemble size = 50, climate size = 672

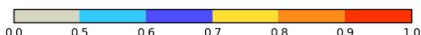
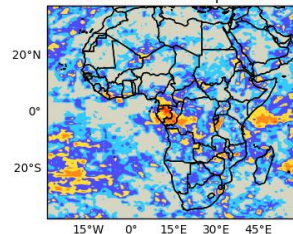
DJF 2018/19



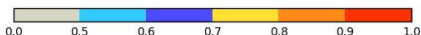
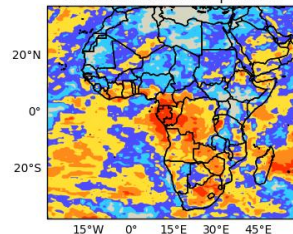
ROC scores for tercile categories Dec/Jan/Feb: Issued November above normal 2m temperature



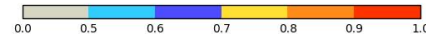
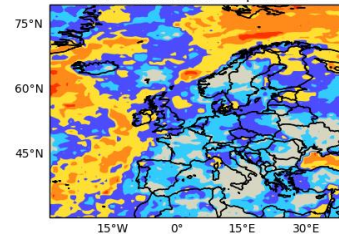
near normal 2m temperature



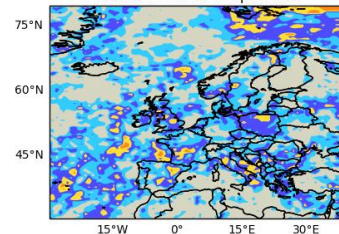
below normal 2m temperature



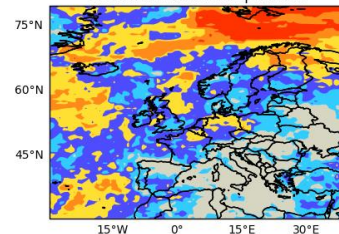
ROC scores for tercile categories Dec/Jan/Feb: Issued November above normal 2m temperature



near normal 2m temperature



below normal 2m temperature



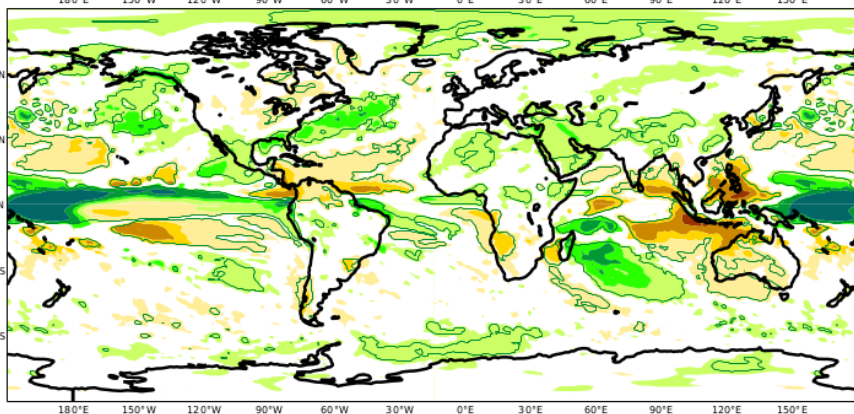


Ensemble mean - DJF from November 2017

C3S: ECMWF contribution
Mean precipitation anomaly
Nominal forecast start: 01/11/18
Ensemble size = 51, climate size = 600

DJF 2018/19
Shaded areas significant at 10% level
Solid contour at 1% level

Legend for precipitation anomalies:
-200mm, -200..100, -100..-50, -50..0, No Signal, 0..50, 50..100, 100..200, > 200mm



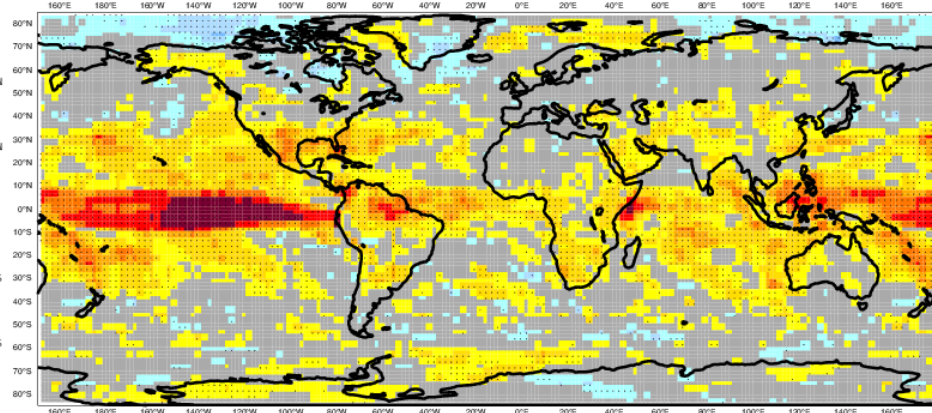
Anomaly correlation - DJF from November

Anomaly Correlation Coefficient for 0001 with 25 ensemble members
Precipitation

Hindcast period 1981-2014 with start in November average over months 2 to 4

Black dots for values significantly different from zero with 95% confidence (1000 samples)

Color scale for Anomaly Correlation Coefficient: -1, -0.9, -0.8, -0.7, -0.6, -0.4, -0.2, 0.2, 0.4, 0.6, 0.7, 0.8, 0.9, 1





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Precipitation - DWD

Ensemble mean - DJF from November 2018

C3S: DWD contribution

Mean precipitation anomaly

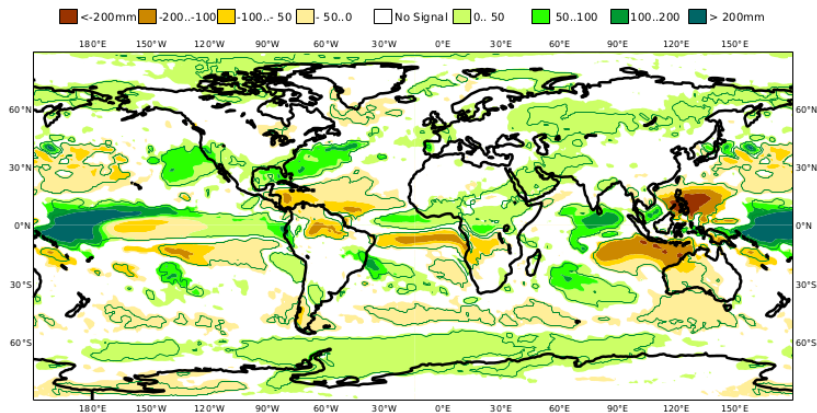
Nominal forecast start: 01/11/18

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DJF 2018/19

Shaded areas significant at 10% level

Solid contour at 1% level



Anomaly correlation - DJF from November

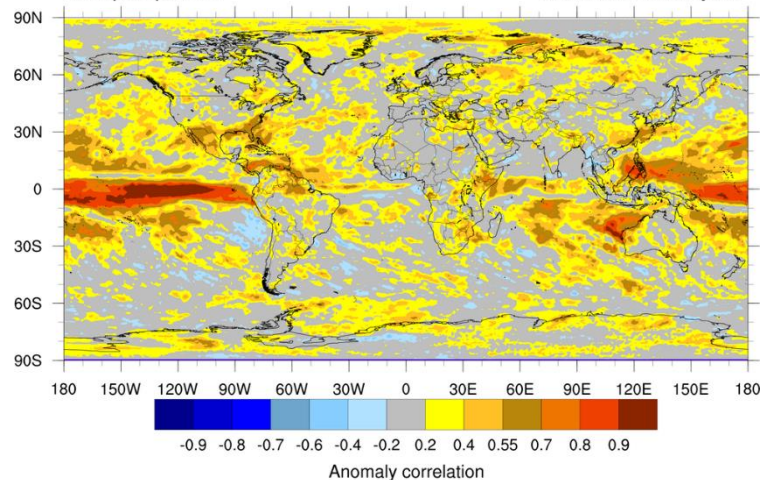
Anomaly correlation

Total precipitation

GCFS2 1990-2018

DecJanFeb (month 2-4)

start at 01/11 each year



© DWD, MPI-M, UHH; generated on 2018-10-31





Climate Change

Precipitation - UKMO

ROC area DJF from November

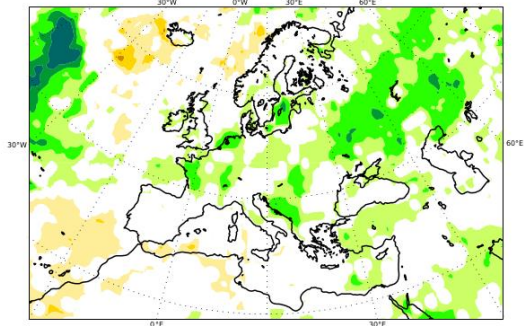
C3S: Met Office contribution

Prob(most likely category of precipitation)

Nominal forecast start: 01/11/18

Ensemble size = 50, climate size = 672

DJF 2018/19



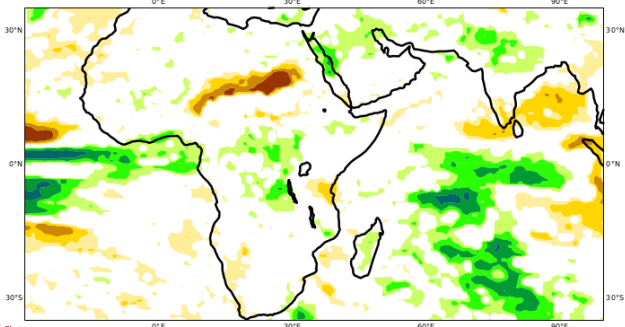
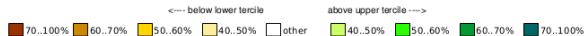
C3S: Met Office contribution

Prob(most likely category of precipitation)

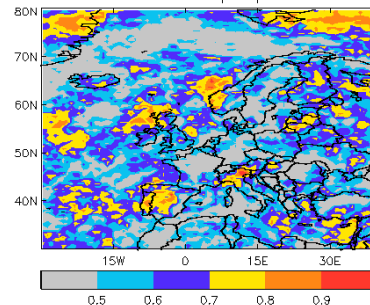
Nominal forecast start: 01/11/18

Ensemble size = 50, climate size = 672

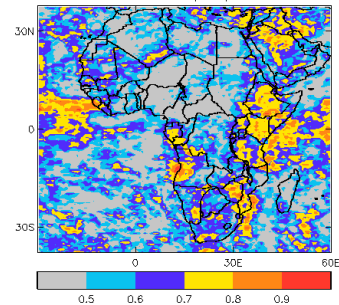
DJF 2018/19



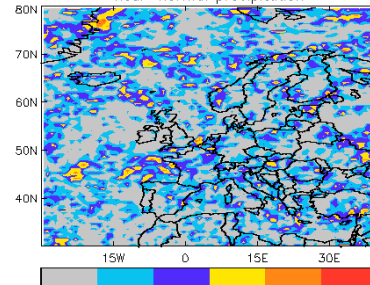
ROC scores for tercile categories Dec/Jan/Feb/: Issued November above-normal precipitation



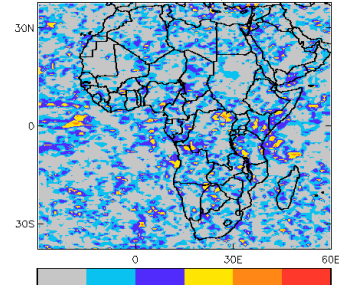
ROC scores for tercile categories Dec/Jan/Feb/: Issued November above-normal precipitation



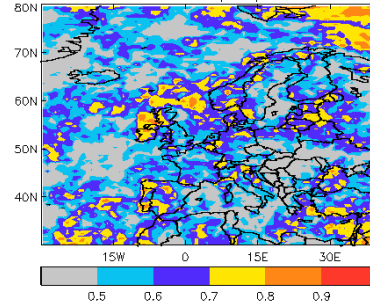
near-normal precipitation



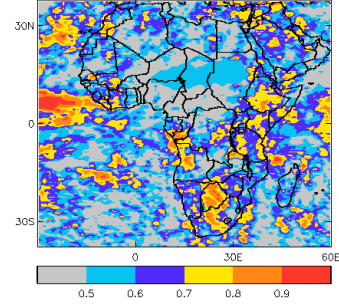
near-normal precipitation



below-normal precipitation



below-normal precipitation





Climate
Change



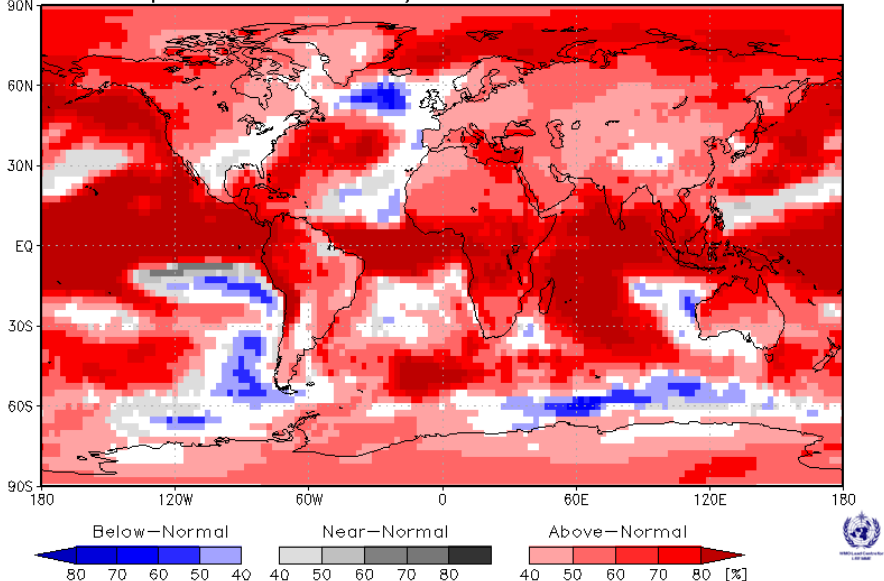
Thank you



Combination of 12 GPC forecasts

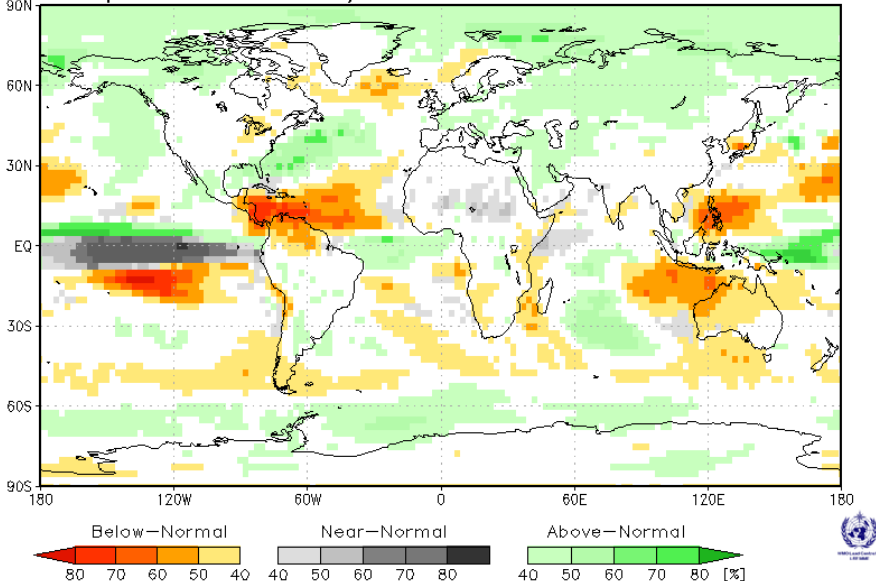
Probabilistic Multi-Model Ensemble Forecast
GPC_Beijing/CPTec/ECMWF/Exeter/Melbourne/Montreal/Moscow/Offenbach/Pretoria/Seoul/Tokyo/Washington

2m Temperature : DJF2018/2019 (issued on Nov2018)



Probabilistic Multi-Model Ensemble Forecast
GPC_Beijing/CPTec/ECMWF/Exeter/Melbourne/Montreal/Moscow/Offenbach/Pretoria/Seoul/Tokyo/Washington

Precipitation : DJF2018/2019 (issued on Nov2018)





Climate
Change

M S L P - E C M W F

Anomaly correlation - DJF from November

Anomaly Correlation Coefficient for 0001 with 25 ensemble members

Mean sea level pressure

Hindcast period 1981-2016 with start in November average over months 2 to 4

Black dots for values significantly different from zero with 95% confidence (1000 samples)

