

South-East European Consortium for Operational weather Prediction (SEECOP)

NMMB monthly forecasts

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ECMWF monthly forecast: Late spring frost over West Balkans (17-24 April 2017)

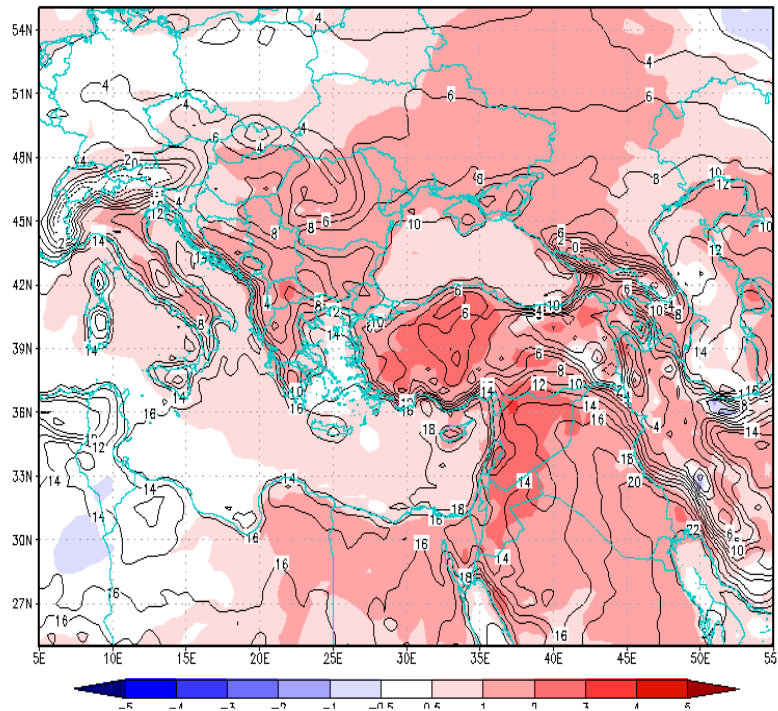
- **Forecast period from two weeks to several months:** Subseasonal to seasonal (S2S)
Monthly forecast, seasonal forecast
- **Uncertainty grows with time:**
After two weeks model usually **can not successfully forecast** important climatological events such as cold and heat waves!

Observed daily minimum temperature at station Pozega April 2017

Date	:	17	18	19	20	21	22	23	24
Temperature:		2.8	-2.6	0.4	-1.4	0.7	-3.3	1.5	-2.7

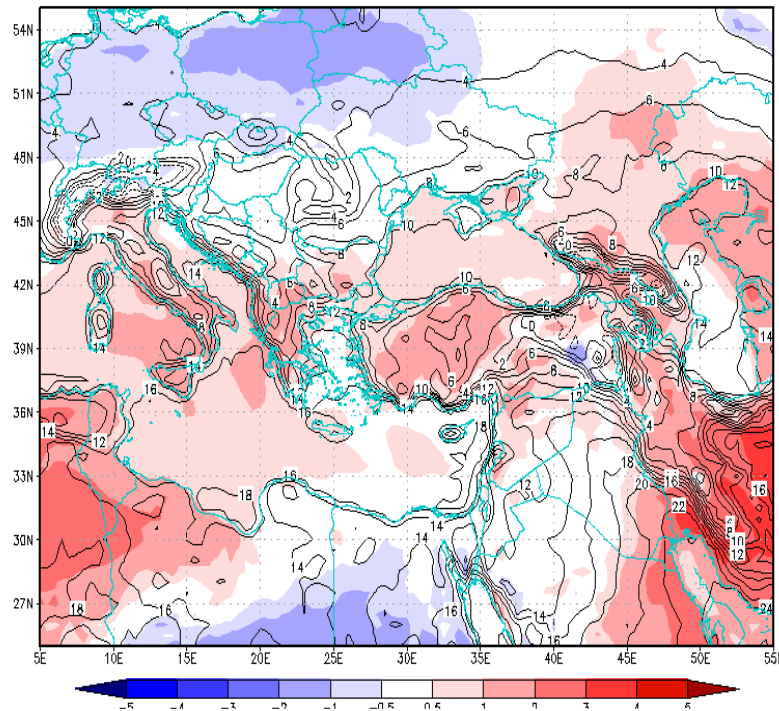
3rd week forecast - **WARMING**

Monthly ECMWF Start: 30.03.2017. Valid: 17.04.2017.-23.04.2017.
Tmin and Anomalies [°C] Hindcast Clim 1994-2010



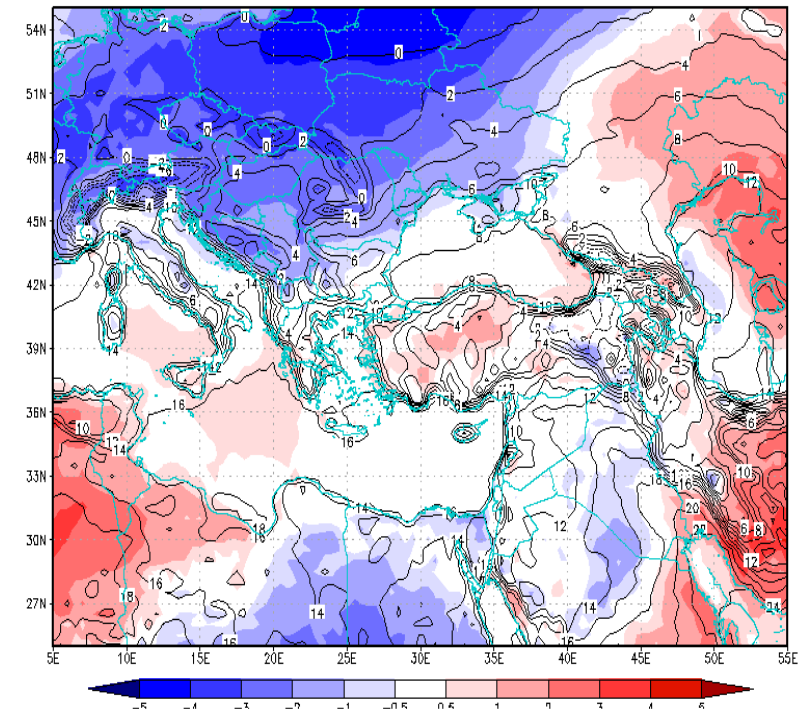
2nd week forecast - **NORMAL**

Monthly ECMWF Start: 06.04.2017. Valid: 17.04.2017.-23.04.2017.
Tmin and Anomalies [°C] Hindcast Clim 1994-2010



1st week forecast - **STRONG COOLING**

Monthly ECMWF Start: 13.04.2017. Valid: 17.04.2017.-23.04.2017.
Tmin and Anomalies [°C] Hindcast Clim 1994-2010



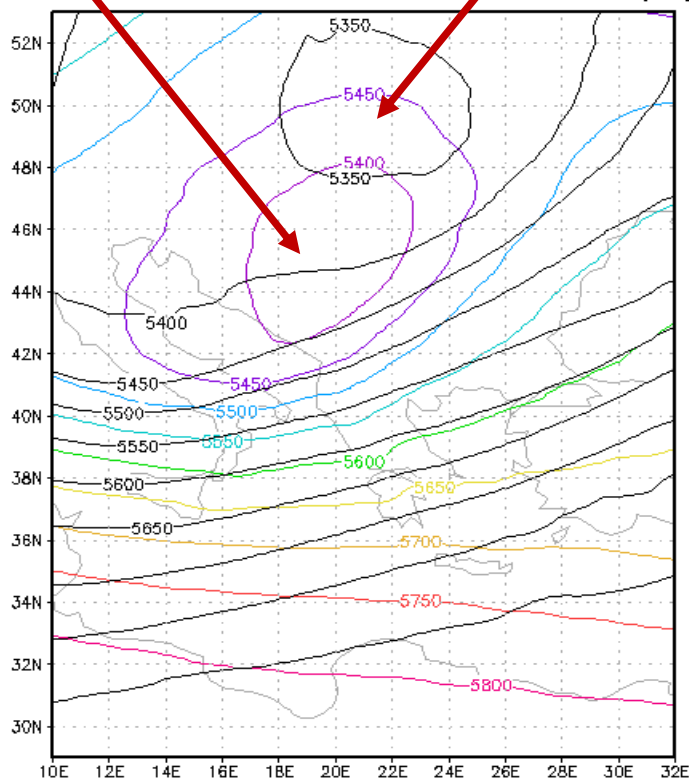
RHMSS NMMB GLOBAL model: Monthly run starting on 6 Apr 2017

- Various model schemes for radiation/microphysics/land surface/
- With/without gravity wave drag
- With constant sea surface temperature (sst) and with analysed sst forcing
- Verification of Z500 geopotential height for various areas

Analysis valid time 20 April

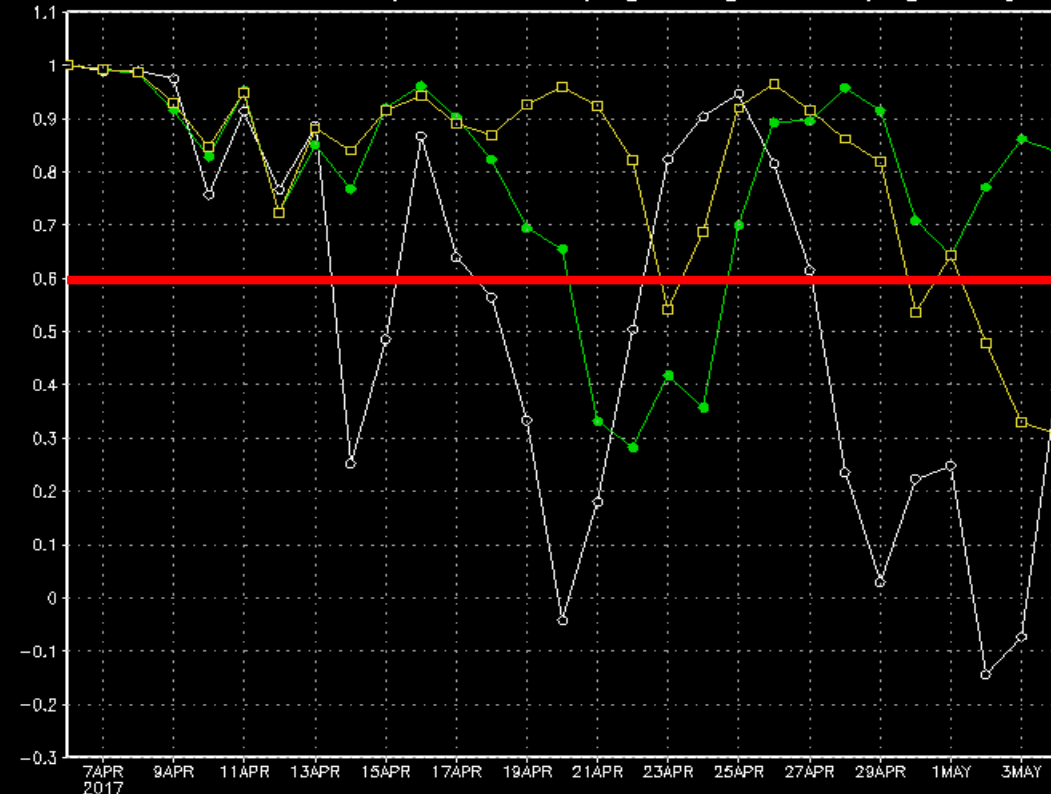
14 day forecast

z500: VT:2017.4.20 ST:2017.4.06 pfgnew



South East Europe **spatial correlation Z500**
POSITIVE INFLUENCE of GWD and SST forcing (yellow line)

ccor-z500-see pf10-wh, pfg10-gr and pfgsst-ye

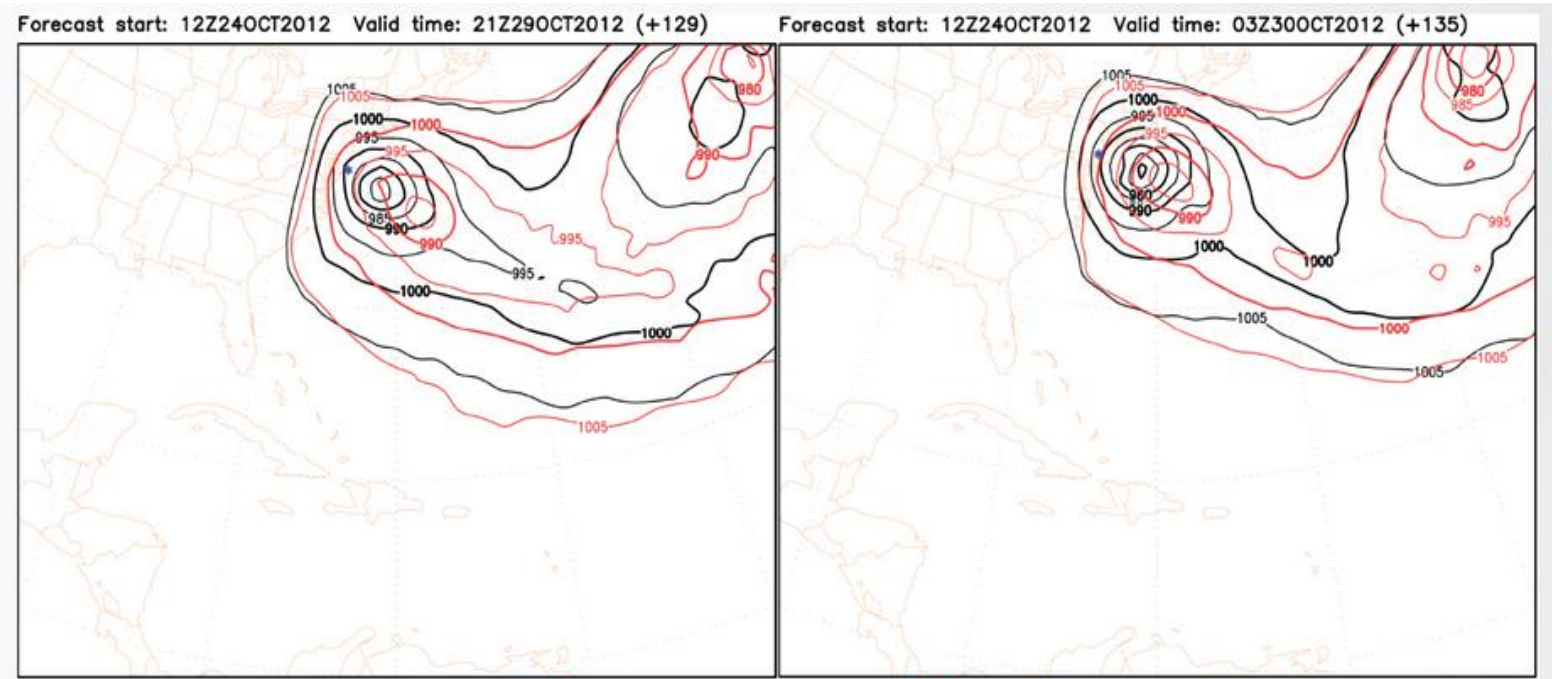
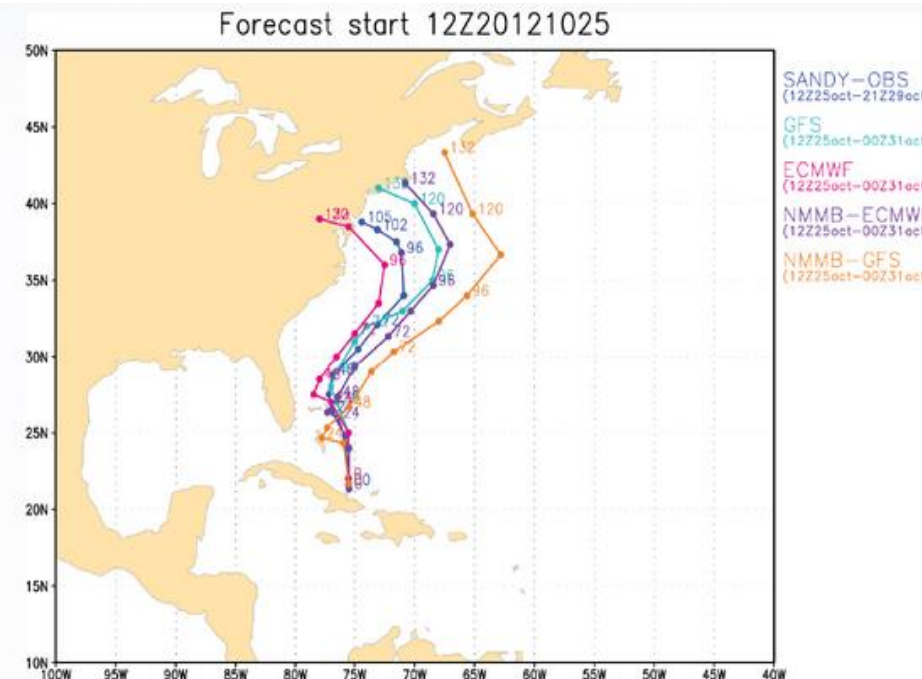


RHMSS NMMB GLOBAL atmospheric model coupled with ocean model: Hurricane SANDY October 2012

- Simulation of the event with constant SST and coupled with ocean model
- Atmospheric model: Global NMMB
- Ocean model: POM – Princeton Ocean Model

Cyclone track

Cyclone position and intensity better forecasted with coupled model!

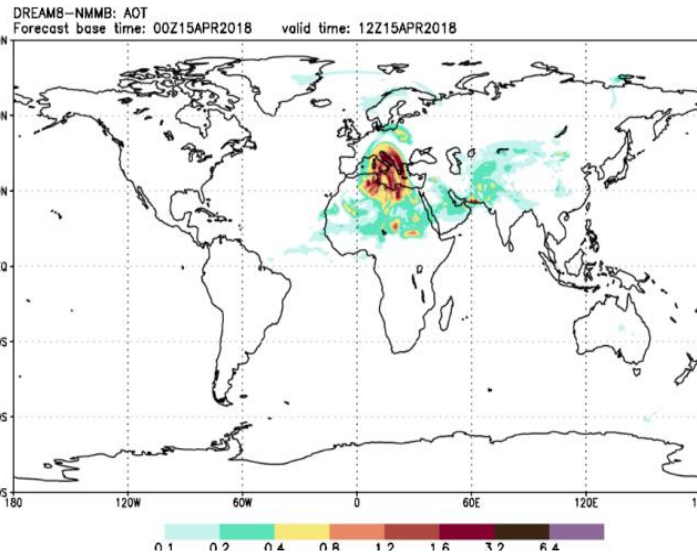


Black contours - coupled run Red contours - uncoupled run Blue asterisk - observed center

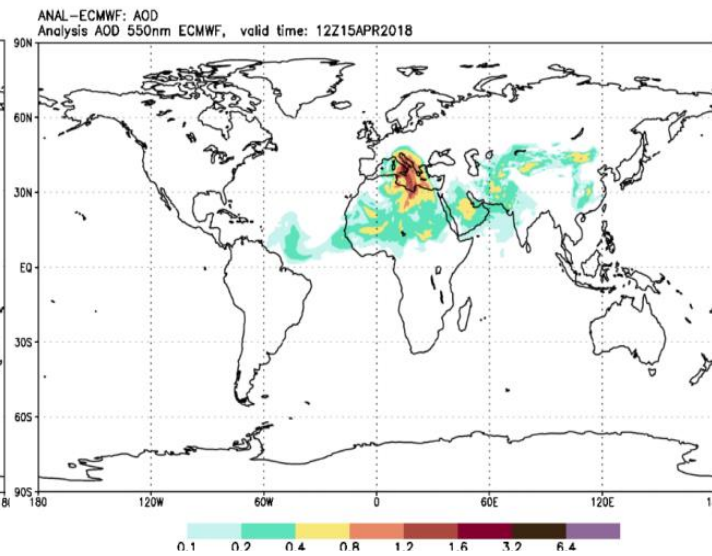
RHMSS NMMB GLOBAL atmospheric model coupled with DREAM model

- The objective is to explore effects of atmosphere-dust aerosol interactions.
- Target forecast period 3-4 weeks
- Atmospheric model: **NMMB** Mineral aerosol model: **DREAM**

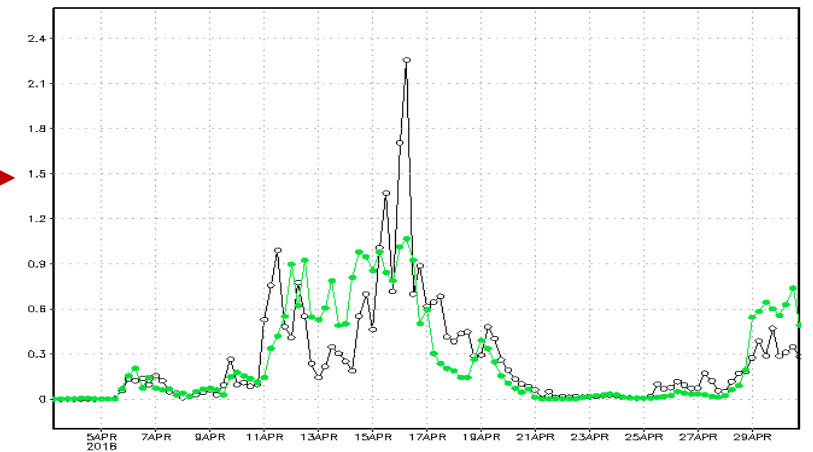
NMMB DREAM AOD forecast



ECMWF CAMS MODEL AOD analysis

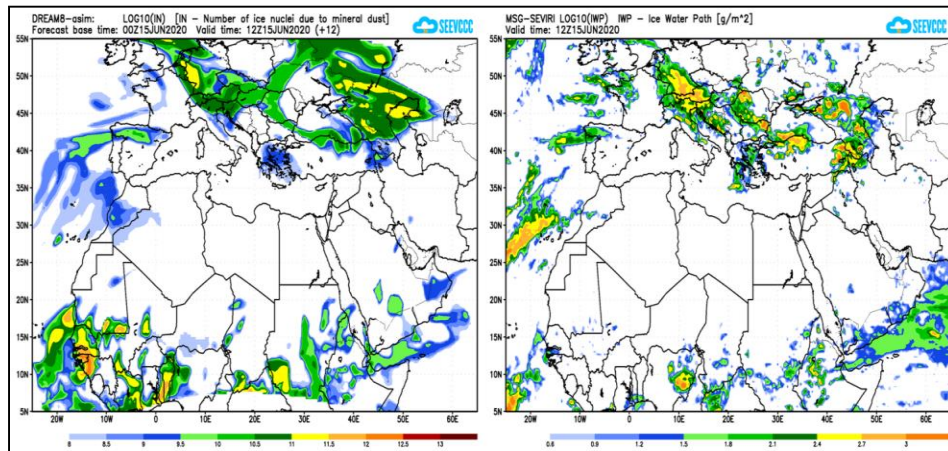


Time evaluation of AOD at Crete for the period of 1-30 April 2018 NMMB DREAM (black) vs CAMS analysis (green)



NMMB DREAM forecast

MSG SEVIRI SATELLITE observation



- Dust aerosol is efficient ice nuclei agent for heterogeneous cloud glaciation.
- Coupled dust-atmospheric modeling system capable to predict **dust-induced ice nucleation**.
- Established daily comparisons of Ice nuclei number over the European-African region.

<http://www.seevccc.rs/?p=8>