# MJO - Indian Ocean - DYNAMO & Diurnal cycle

Meteosat 9 IR10.8 20120220 15 UTC

ECMWF oper Fc 20120220 00 UTC+15h:



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## **The MJO**



27 November 2011: Meteosat 7 + IFS Analysis





# **Progress in MJO prediction**





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### **MJO initiation over Indian Ocean**

Take a long time series of filtered TRMM data and ERA-Interim reanalysis

Identify MJO events, distinguish between primary, and successive, and separate from non-MJO convective events





see also Ling et al. JAS 2013 to appear

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### **Anomalies in precipitation and 850 hPa wind**





### **Temperature anomalies**

#### **Primary MJO**

#### **Non-MJO**

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#### significant cold anomaly in mid-troposph. 10-20 days ahead

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### **Specific humidity anomalies**



## **Effect of moisture sensitivity in convection scheme** to MJO prediction



### **Impact of observations during DYNAMO: Data denial experiments**

#### **Rms difference of analysis: average 400-850 hPa**



#### Significant Analysis impact of DYNAMO observations in Indian Ocean

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**Impact : Analysis-fit to Sondes** 



Sondes well assimilated – impact on MJO forecasts rel. small

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## **Diurnal cycle of Precipitation JJA: Amplitude (mm/d)**



## **Diurnal cycle of Precipitation JJA: Phase (LST)**



# Conclusions

• Examined initiation of the MJO over Indian Ocean: Precursors that lead to MJO development – compared to non-propagating convection are: easterly winds and dry anomaly in eastern Indian Ocean/Maritime Continent, and a mid-tropospheric cold anomaly over Indian Ocean

Could not identify where these anomalies come from: extra-tropical Rossby wave forcing? also good to still look at significance of 200 hPa wind anomalies (Africa/Arabia)

 DYNAMO extra data beneficial for Analysis over Indian Ocean – extendedrange MJO forecasts mostly unaffected

Breakthrough in simulating the diurnal cycle of convection in global models?

We hope so! should become next operational model version: but diurnal cycle over land has little impact on MJO (forecasts).

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