



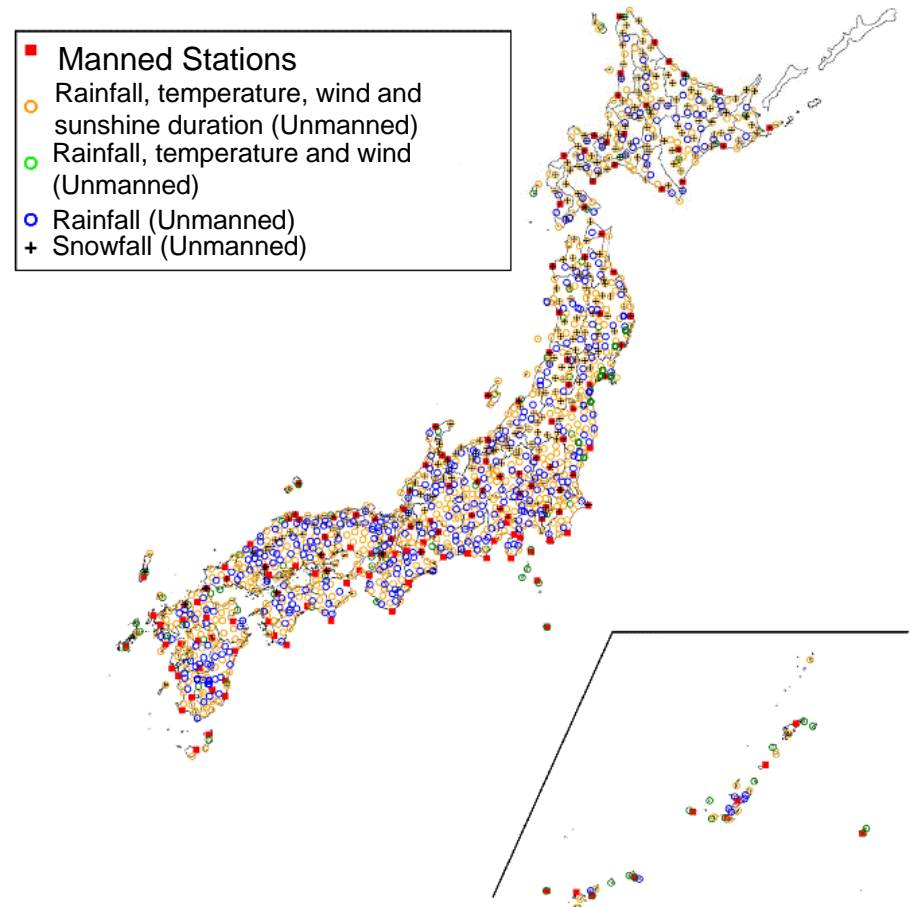
# WGNE QPF VERIFICATION over Japan Sep2012 – Nov2013

Chiashi Muroi and colleagues at JMA  
10-13 Mar. 2014, Melbourne  
WGNE-29

# Data and Verification Method

- Verification grid
  - 80km x 80km
- Reference data (Observations)
  - Amount of precipitation observed by raingauges
- Verified data (QPFs data)
  - Please see next page.
- Converting method
  - High resolution QPFs and Observations
    - Simple Average
  - Low resolution QPFs
    - Interpolation
- Verification method
  - Bias Score
  - Equitable thread score
  - Extremal Dependency Index (EDI)

$$EDI = \frac{\log F - \log H}{\log F + \log H} \quad \begin{array}{l} F: \text{ False alarm rate} \\ H: \text{ Hit rate} \end{array}$$



-About 1300 stations over Japan

-It corresponds to 17km x 17km horizontal resolution.

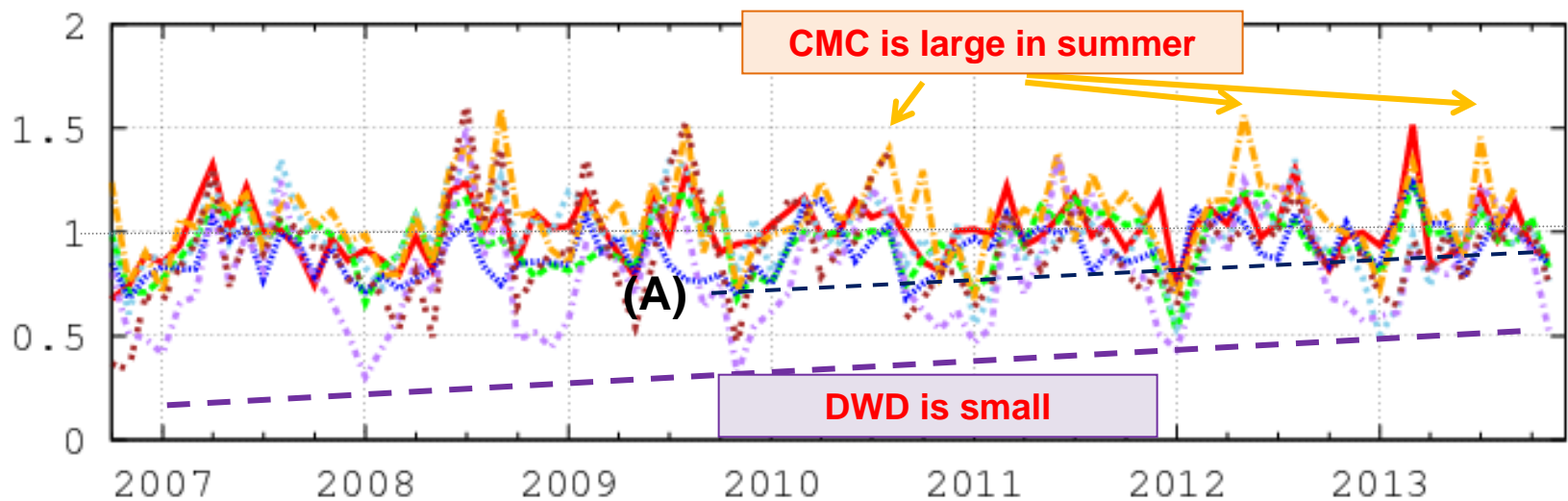
# Data Specifications (~ Dec. 2013)

NWP center	horizontal resolution of verified data (degree)	forecast time (hour)	Deep convection scheme	Large scale cloud scheme	converting method
BoM	1.25 X 0.83 0.5625 X 0.375	6,12,18,...,144	Gregory and Rowntree (1990)	Wilson and Ballard (1999)	Interpolate Average
CMC	1.00 X 1.00	6,12,18 ,...,120	Kain and Fritsch (1990), (1993)	Sundqvist et al. (1989), Pudykiewicz et al. (1992)	Interpolate
DWD	0.25 X 0.25	6,12,18,...,174	Tiedtke (1989)	Kessler-type	Average
ECMWF	0.50 X 0.50	6,12,18,...,72	Tiedtke (1989)	Tiedtke (1993)	Average
NCEP	1.00 X 1.00	6,12,18,...,84	Pan and Wu (1994)	Zhao and Carr (1997)	Interpolate
UKMO	0.35 X 0.23	6,12,18,...,96	Gregory and Rowntree (1990)	PC2: Wilson et al. (2008) Wilson and Ballard (1999)	Average
JMA	0.25 X 0.25	6,12,18,...,84	Arakawa and Schubert (1974)	Smith (1990)	Average
observation	Corresponding to 17km X 17km	-	-	-	Average

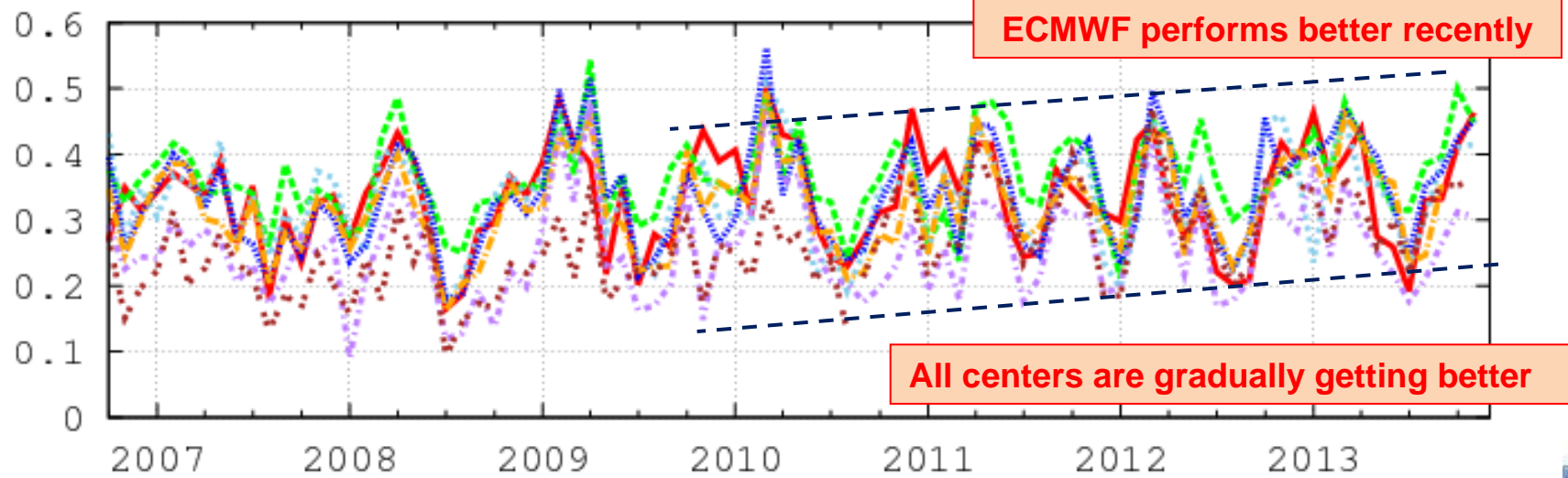
# Recent major changes

- **BoM**
  - 28 Mar. 2012: Global model upgrade from APS0 (80kmL50) to APS1 (40kmL70).
- **CMC**
  - 13 Feb. 2013: Horizontal resolution upgrade from 33km to 25km and vertical coordinates change from sigma to sigma-p hybrid coordinates.
- **ECMWF**
  - 19 Nov. 2013: Introduction of IFS40R1 (Change many physical processes including moist process and boundary layer process).
  - 25 Jun. 2013: The number of model levels increases from L91 to L137.

Bias Score 10mm/24hr FT48-72

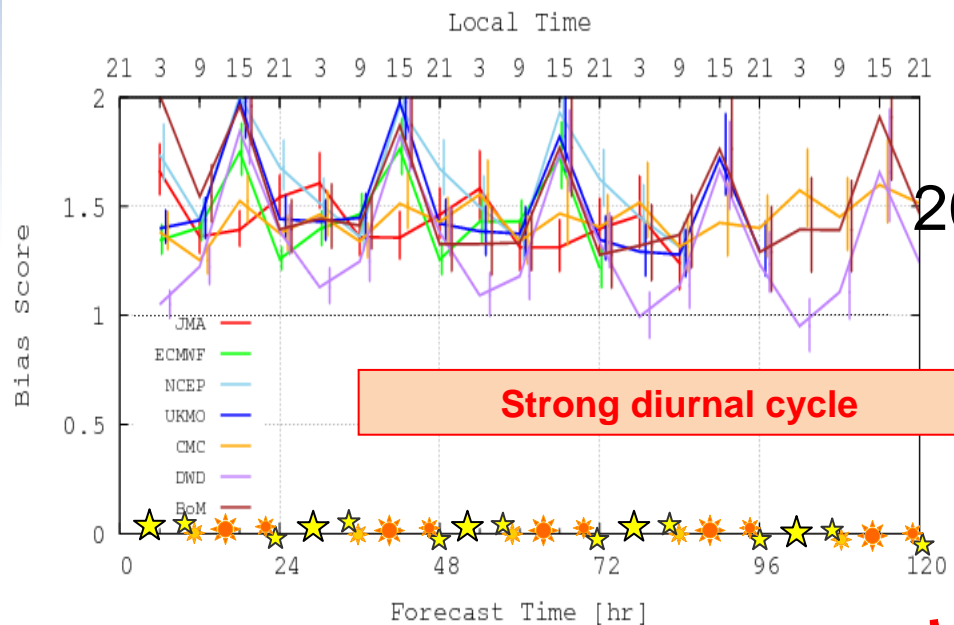


Equitable Threat Score 10mm/24hr FT48-72

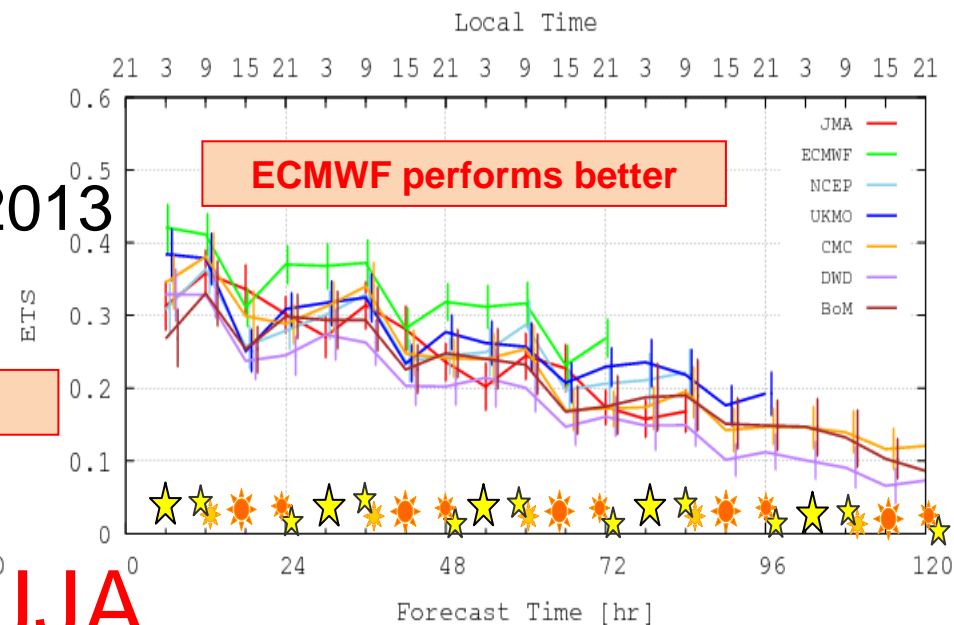


JMA — ECMWF - - - NCEP ···· UKMO ····· CMC - · - · DWD ······ BoM ····

Bias Score 0.5mm/6hr 2013/06-2013/08

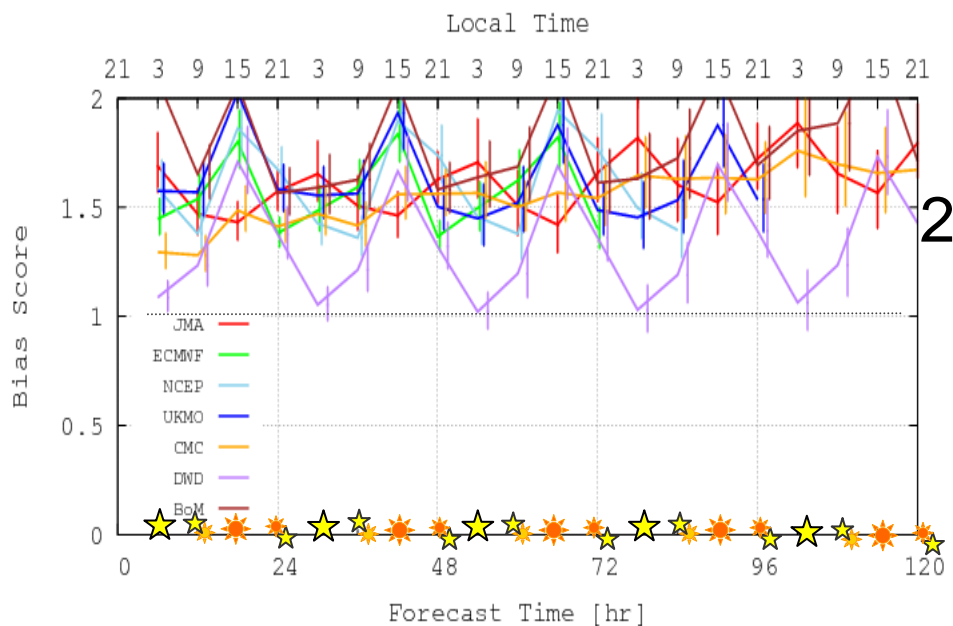


Equitable Threat Score 0.5mm/6hr 2013/06-2013/08

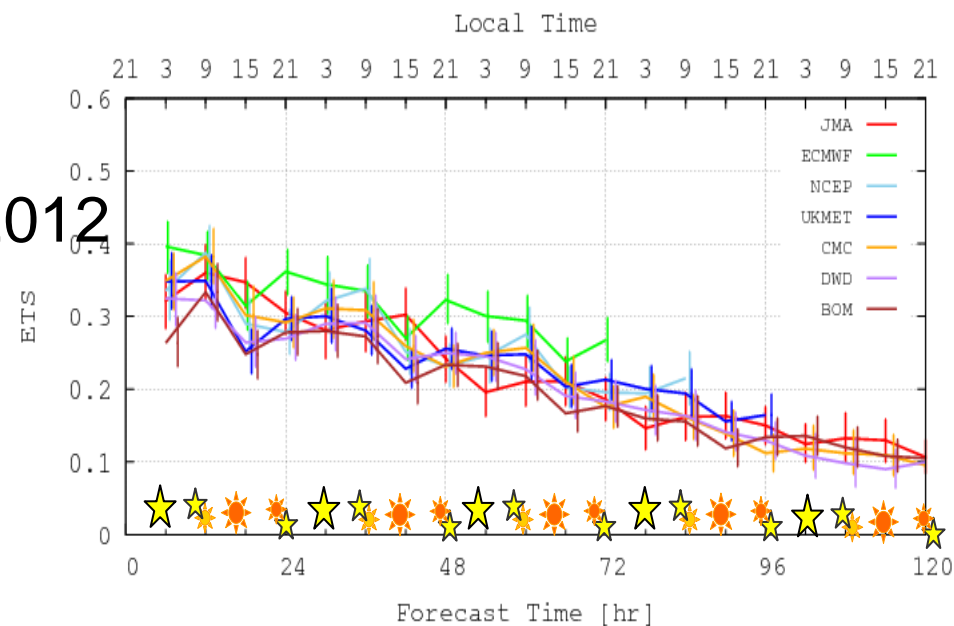


2013  
JJA  
SUMMER

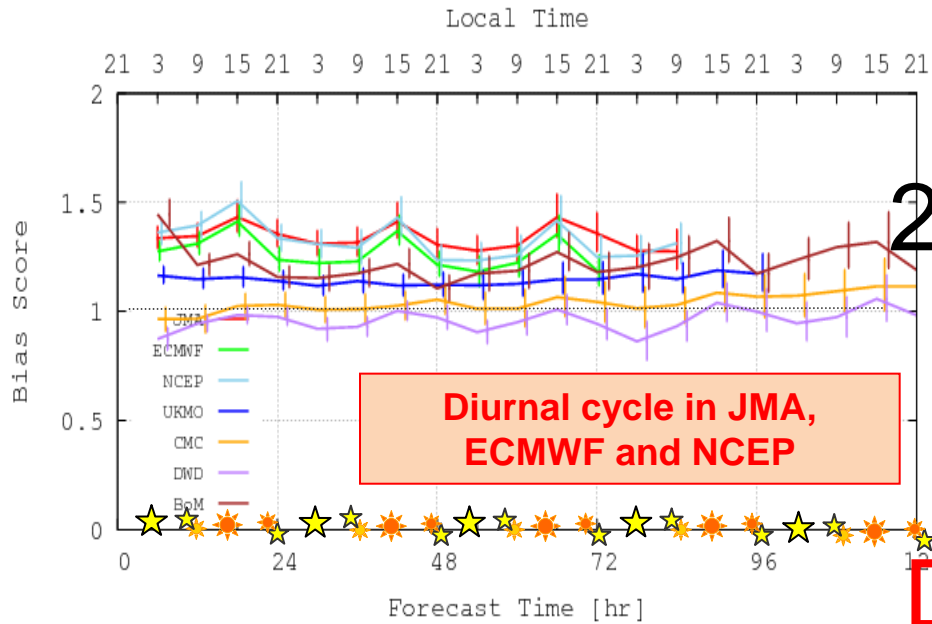
Bias Score 0.5mm/6hr 2012/06-2012/08



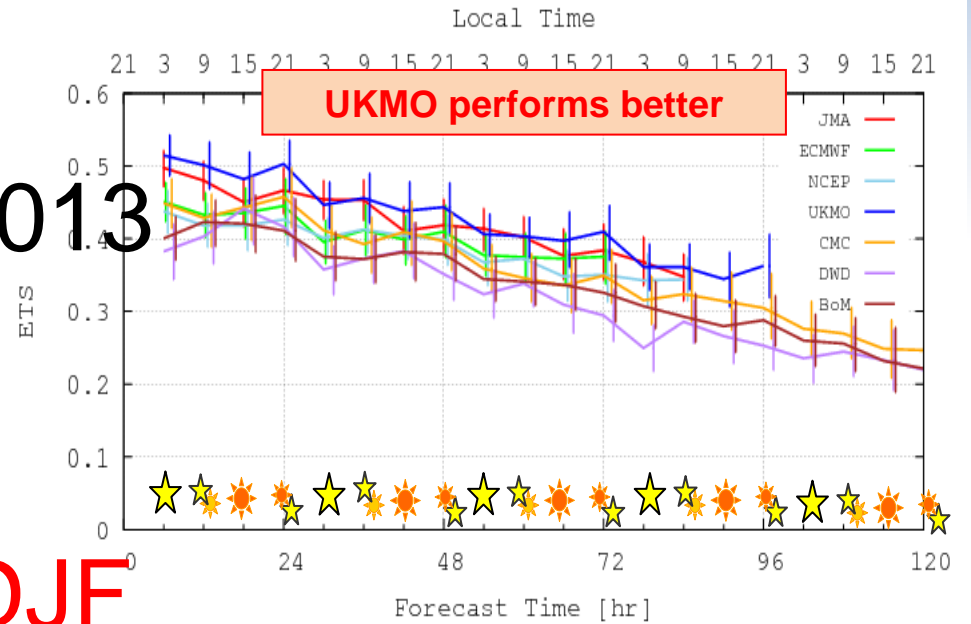
Equitable Threat Score 0.5mm/6hr 2012/06-2012/08



Bias Score 0.5mm/6hr 2012/12-2013/02

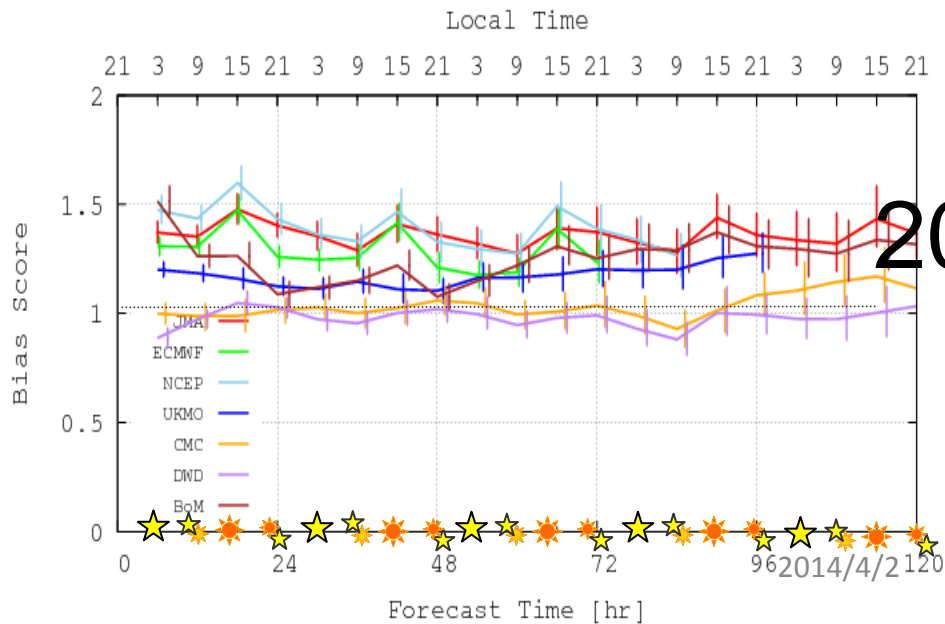


Equitable Threat Score 0.5mm/6hr 2012/12-2013/02

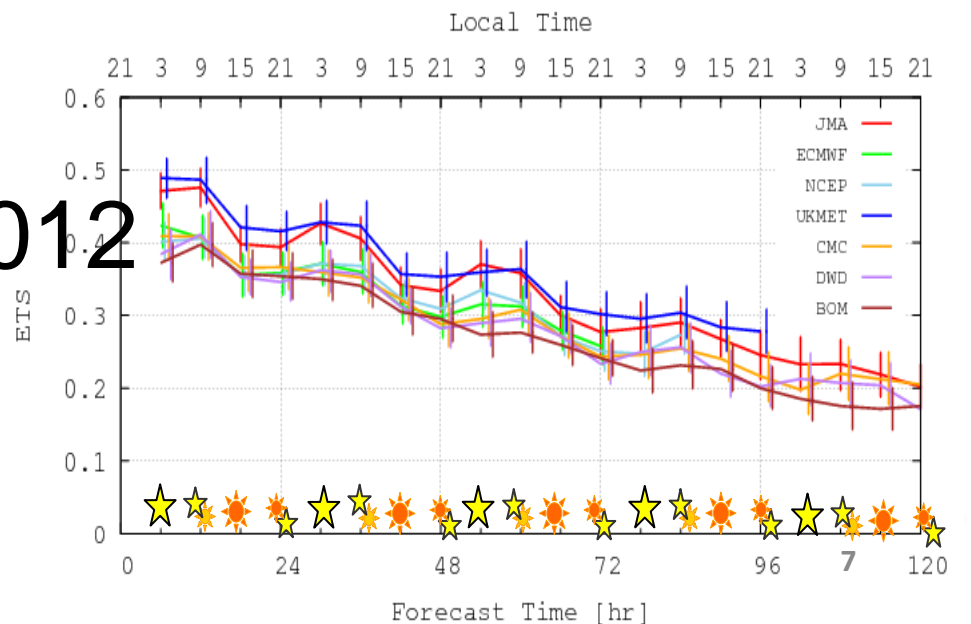


DJF  
WINTER

Bias Score 0.5mm/6hr 2011/12-2012/02

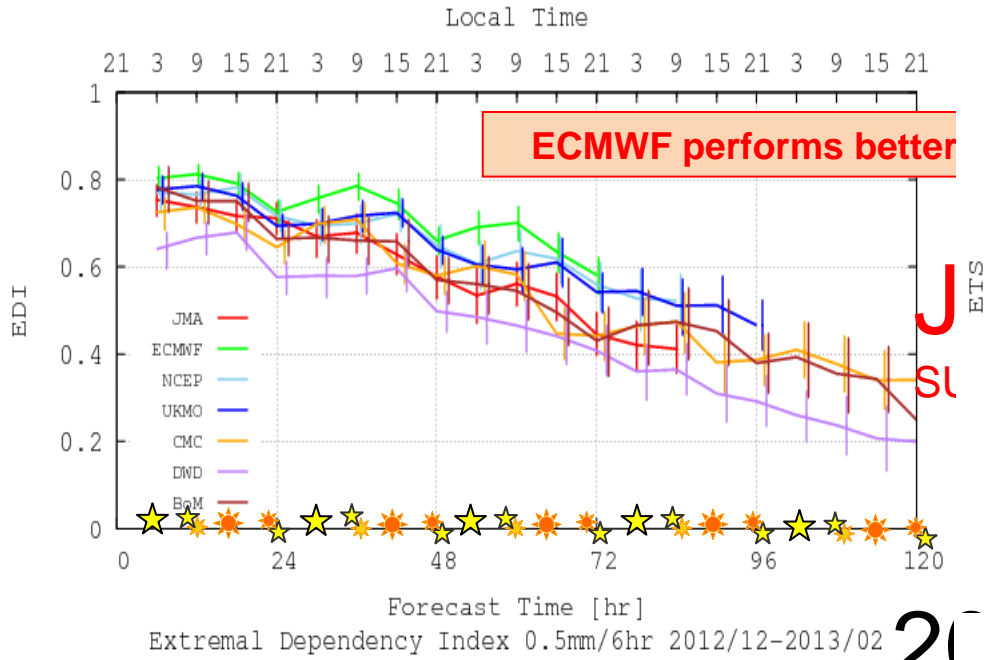


Equitable Threat Score 0.5mm/6hr 2011/02-2012/02



# Extremal Dependency Index

Extremal Dependency Index 0.5mm/6hr 2013/06-2013/08



$\log F - \log H$   $F$ : False alarm rate

Equitable Threat Score 0.5mm/6hr 2013/06-2013/08

