Common Plots
Conditional Verification

Dimitra Boucouvala & WG5

Conditional Verification on Common Area (All seasons)

- **2mT verification with the following criteria (1 condition):**

  – Soil Water Content >= 4 (moist condition) (condition based on forecasts)
  – Soil Water Content < 2 (dry condition) (condition based on forecasts)

- **Wind speed verification with the following criteria (1 condition):**

  – Roughness length >= 1m (rough cases) (condition based on forecasts)
  – Roughness length < 0.2 m (smooth cases) (condition based on forecasts)

Percentage of cases for Soil Moisture condition sometimes too small (0.5-2%) especially TS >4, in winter both conditions

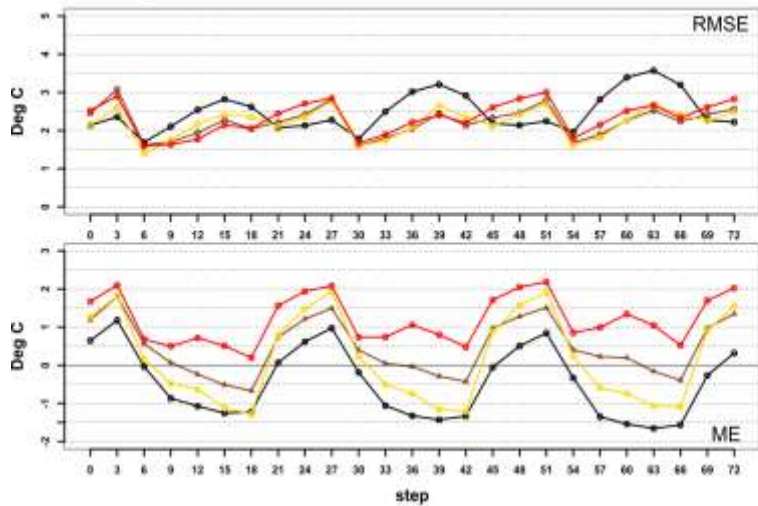ECMWF wind Z0<0.2 too few cases (1-2%)
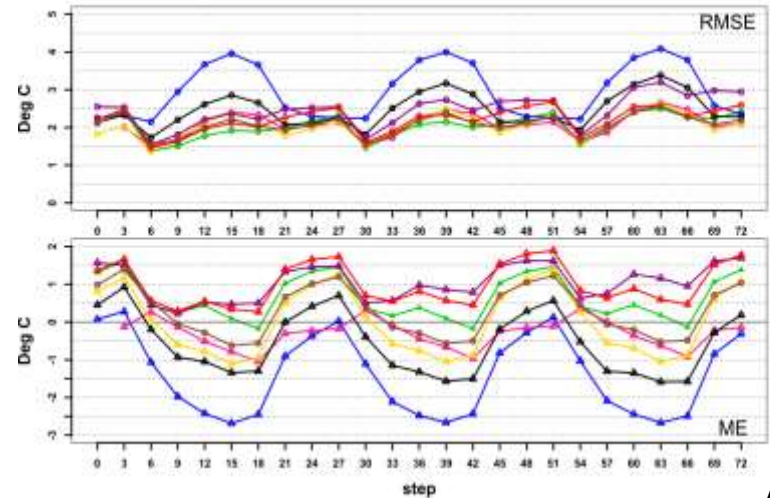
Temperatures

Summer 2014 (JJA)

C-I7
C-PL
C-ME
C-7

Temperature 2m Soil Water Content < 2, JJA 2014, Common area

DRY

Temperature 2m, JJA 2014, Common area, All stations

ALL

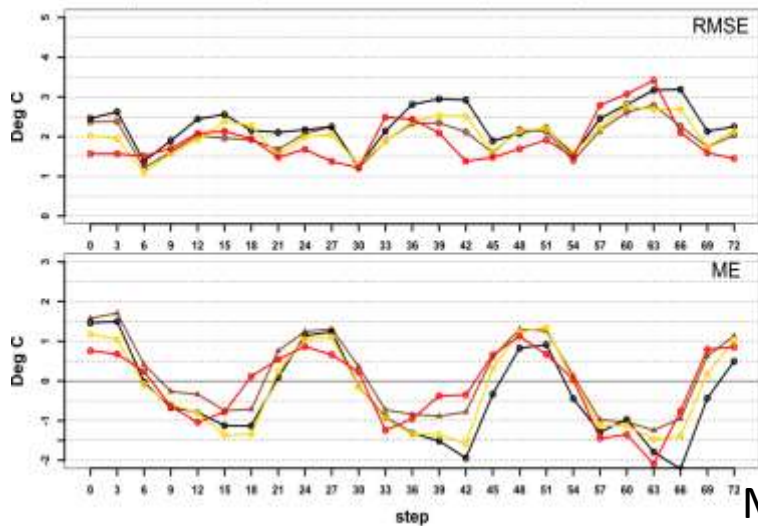Temperature 2m, Soil Water Content > 4, JJA 2014, Common area
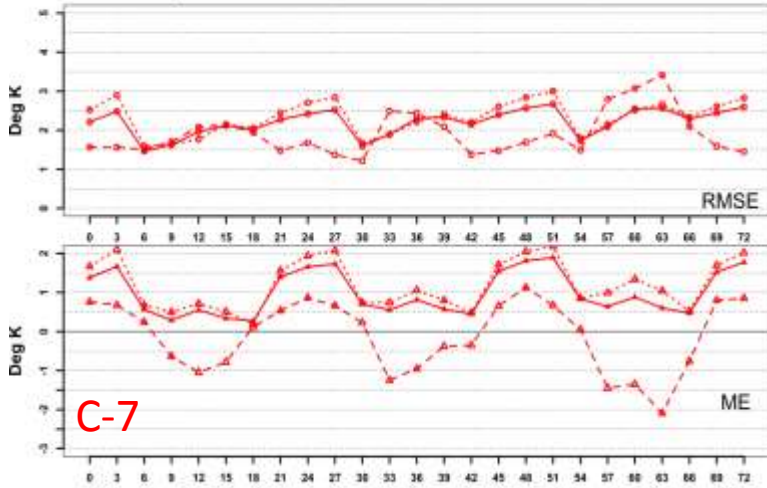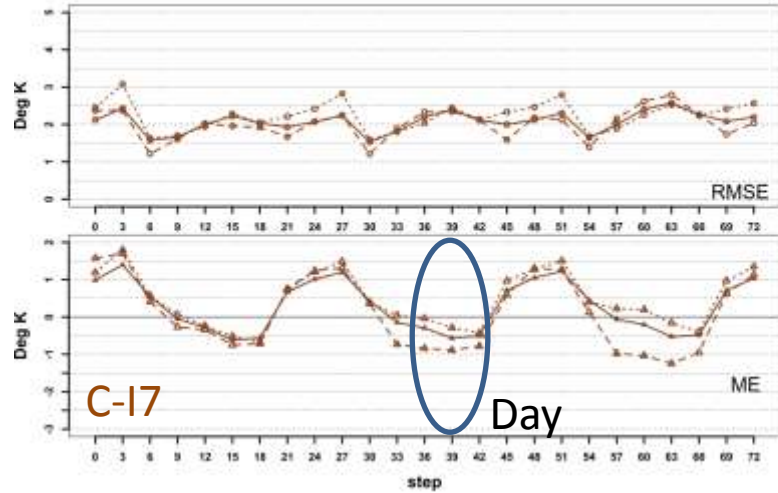
MOIST

DRY and MOIST have
Similar diurnal variation, except for
C-7, MOIST models grouped together .
Are there any common trends ?
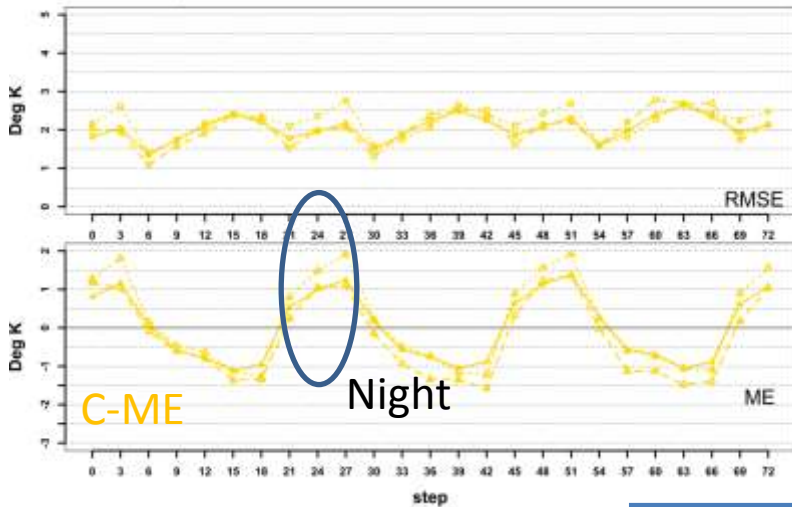
Temperature CND 7, JJA 2014, Common area, All stations

C-7

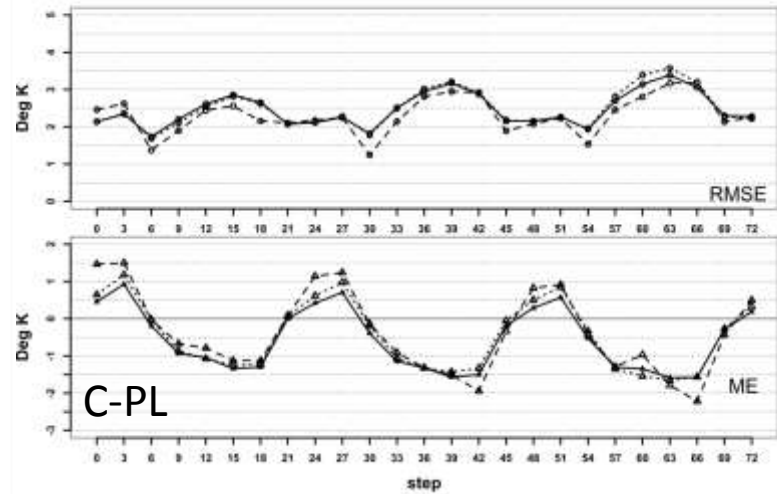Temperature CND I7, JJA 2014, Common area, All stations

C-I7   Day

MOIST : Slightly bigger negative ME in the day
DRY : Slightly bigger positive ME at night . NOTE C-7 too few MOIST cases
Comparable RMSE

C-ME   Night

C-PL

UNCND
SW>4 (MOIST)
SW<2 (DRY)

Temperatures

Fall 2014 (SON)

C-I7
C-RU7
C-PL
C-GR
C-ME
C-7

Temperature 2m Soil Water Content < 2, SON 2014, Common area
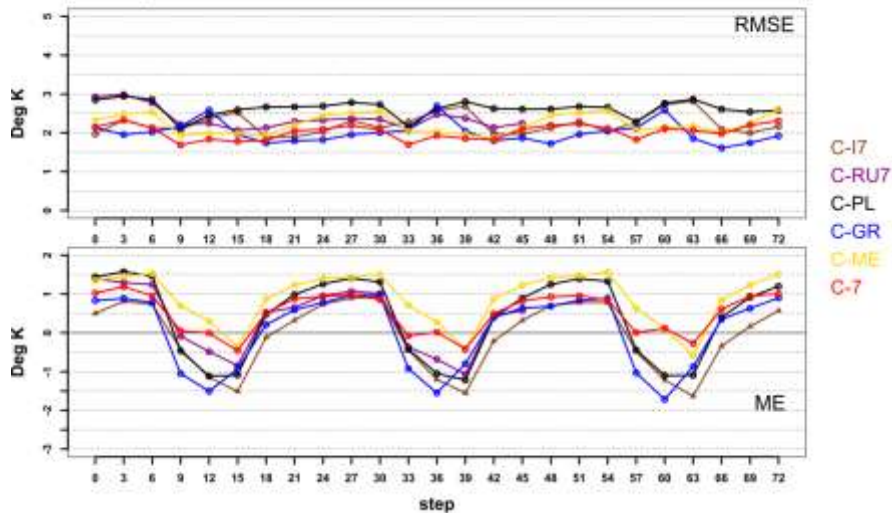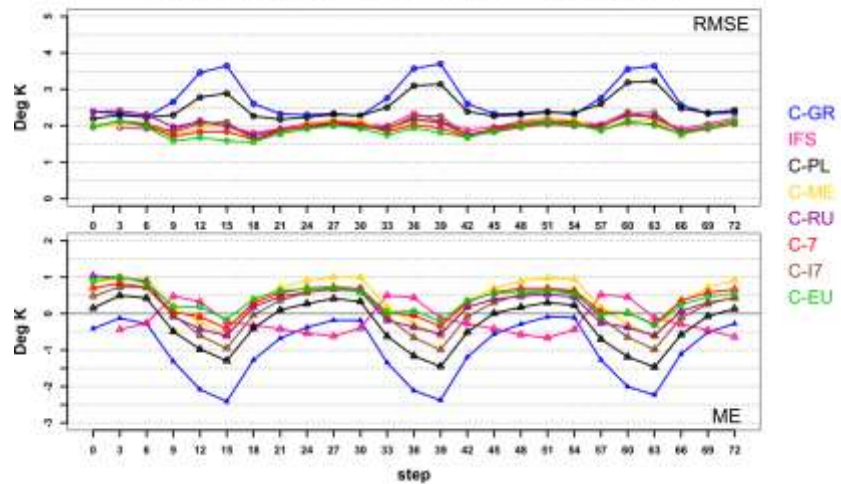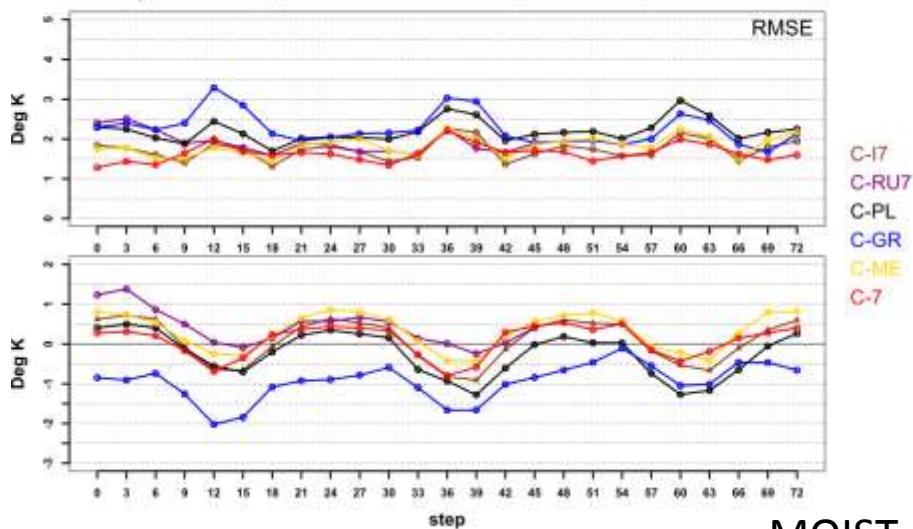
DRY

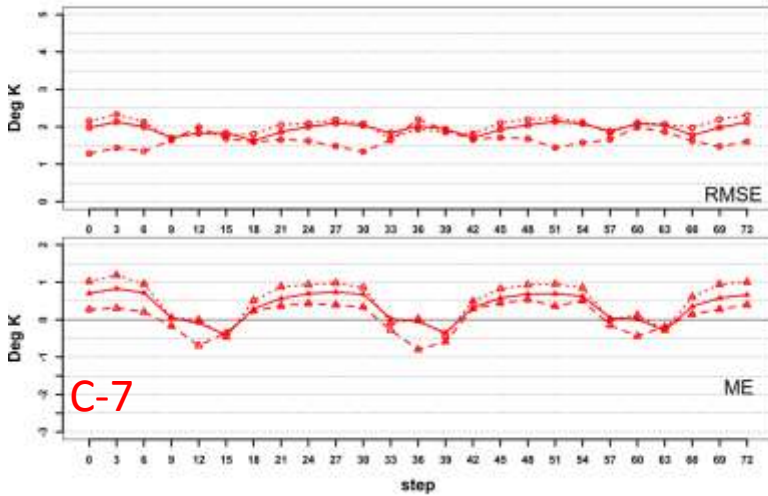Temperature 2m, SON 2014, Common area, All stations

ALL
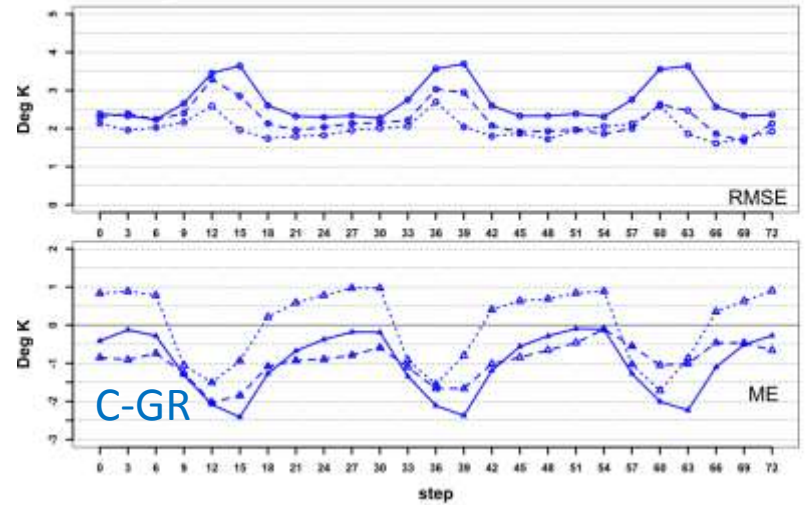

Temperature 2m, Soil Water Content > 4, SON 2014, Common area

MOIST

MOIST cases ME diurnal cycle is now smoother than DRY, RMSE Peaks for MOIST.

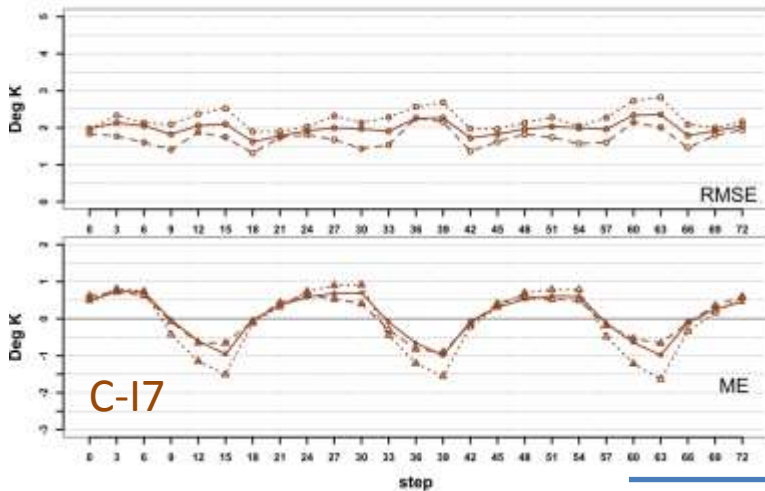Temperature CND 7, SON 2014, Common area, All stations — RMSE / ME — C-7

Temperature CND GR SON 2014, Common area, All stations — RMSE / ME — C-GR
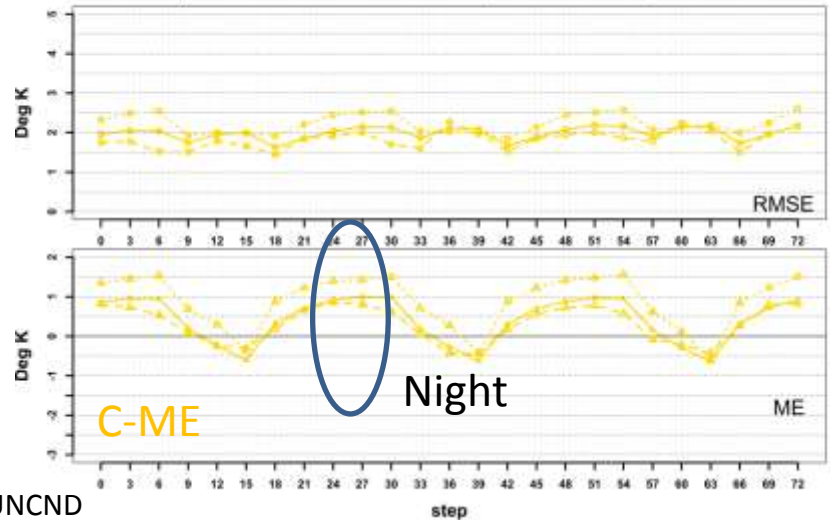
DRY : Slightly bigger positive ME at night (more C-GR, C-PL, C-ME.) Daytime trend not so clear-smaller differences
Big diurnal Cycle for DRY C-GR RMSE for MOIST slightly smaller (except C-GR)

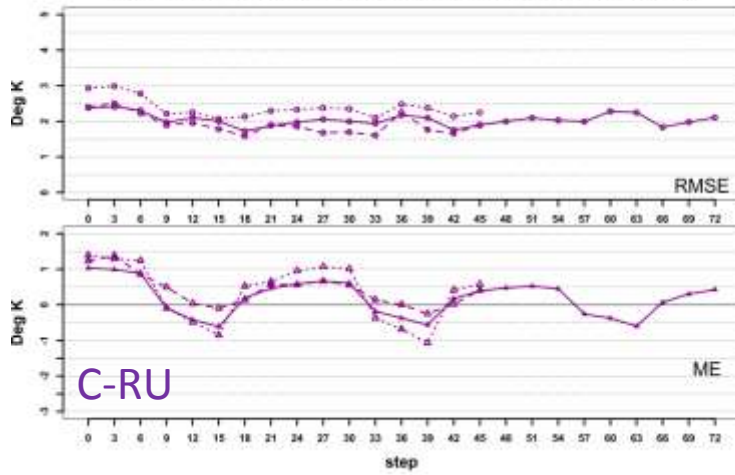Temperature CND I7, SON 2014, Common area, All stations — RMSE / ME — C-I7

Temperature CND ME SON 2014, Common area, All stations — RMSE / ME — C-ME — Night
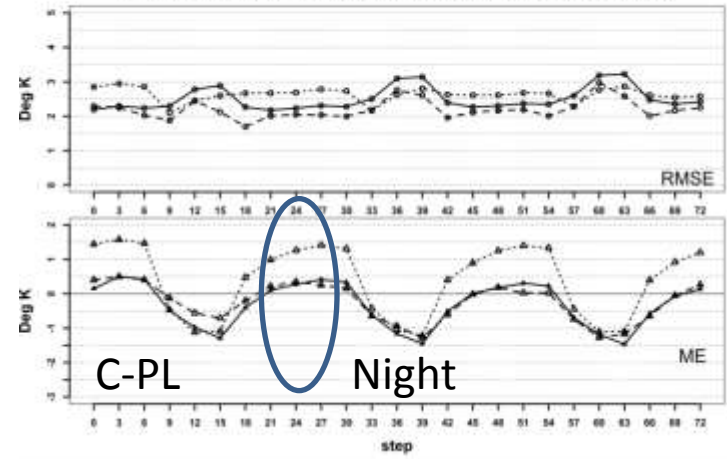
UNCND

SW>4 (MOIST)

SW<2 (DRY)

Temperature CND RU SON 2014, Common area, All stations

C-RU

Temperature CND PL, SON 2014, Common area, All stations

C-PL   Night

UNCND
SW>4 (MOIST)
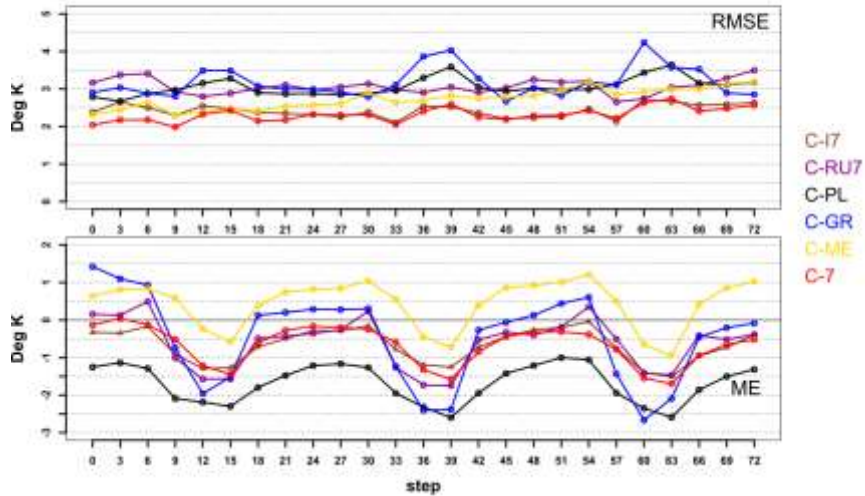SW<2 (DRY)

Temperatures

Winter 2014-15 (DJF)

C-I7
C-RU7
C-PL
C-GR
C-ME
C-7

DRY

ALL
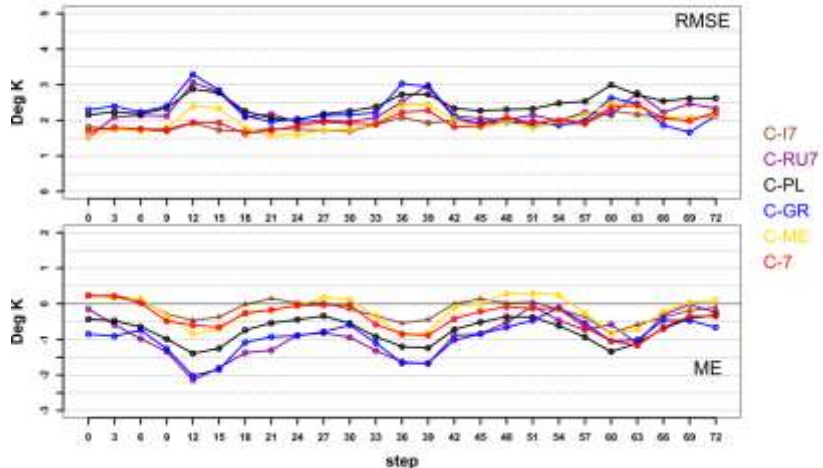
MOIST

MOIST cases ME diurnal cycle
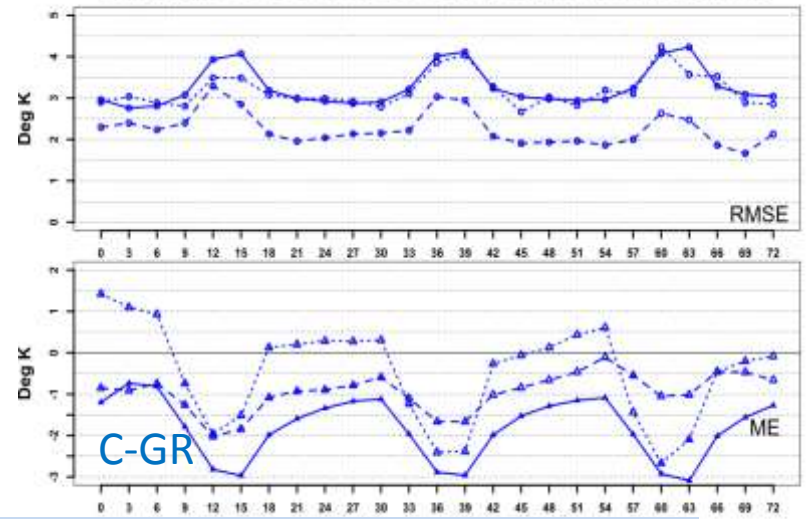is again smoother than DRY,
RMSE Peaks for MOIST, ME decreases
with time

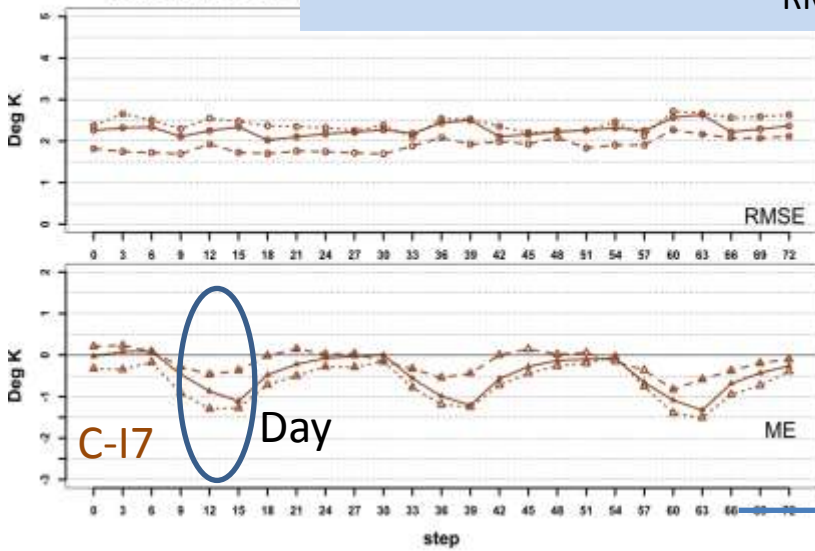Temperature CND 7, DJF 2014-2015, Common area, All stations

C-7
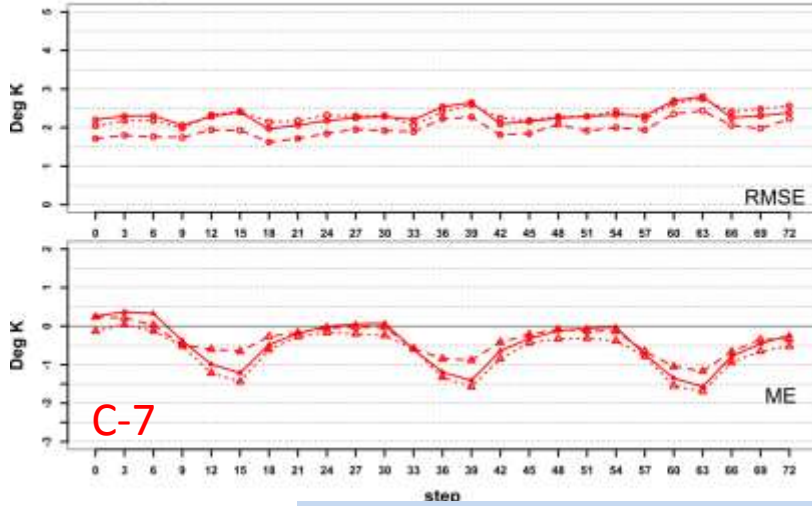
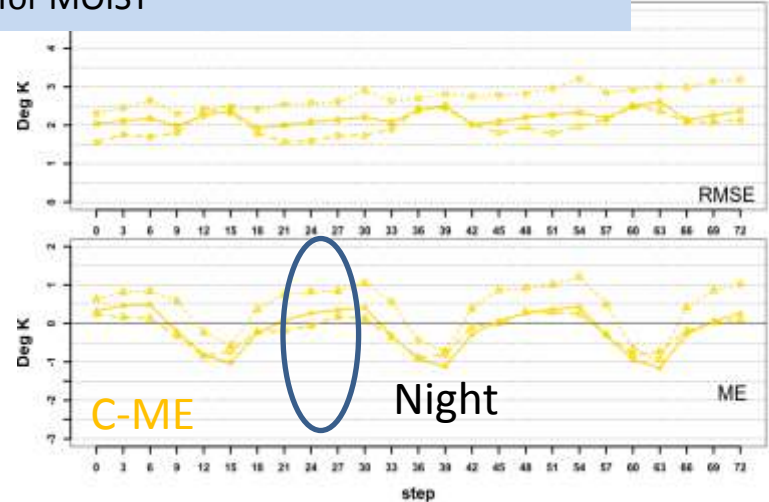Temperature CND GR DJF 2014-2015, Common area, All stations

C-GR

MOIST : ME less negative in the day, less for C-RU
DRY: : ME more positive at night for C-ME, C-GR more negative for C-PL (not clear trend).
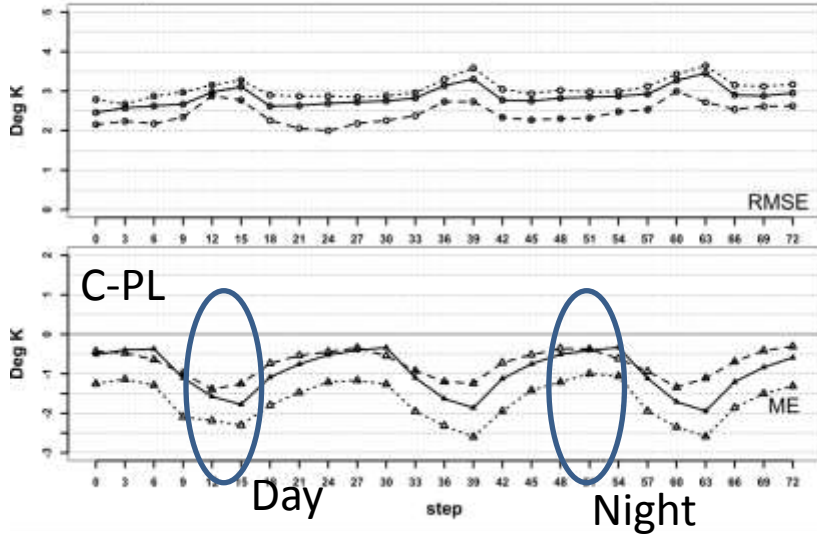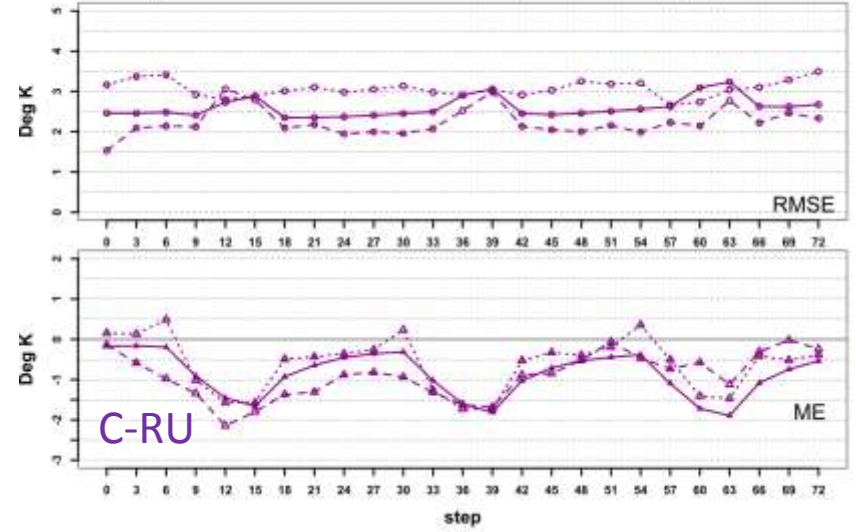RMSE smaller for MOIST

Temperature CND

All stations

C-I7

Day

C-ME

Night

UNCND
SW>4 (MOIST)
SW<2 (DRY)

Temperature CND PL, DJF 2014-2015, Common area, All stations

RMSE

C-PL

Day

Night

ME

step

Temperature CND RU DJF 2014-2015, Common area, All stations

RMSE

C-RU

ME

step

Temperatures

Spring 2015 (MAM)

C-I7
C-RU7
C-PL
C-GR
C-ME
C-7

Temperature 2m Soil Water Content < 2, MAM 2015, Common area (RMSE / ME)
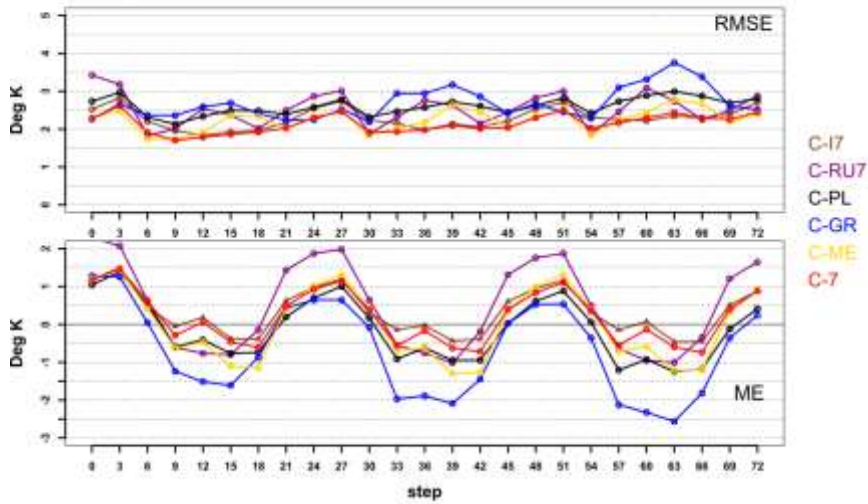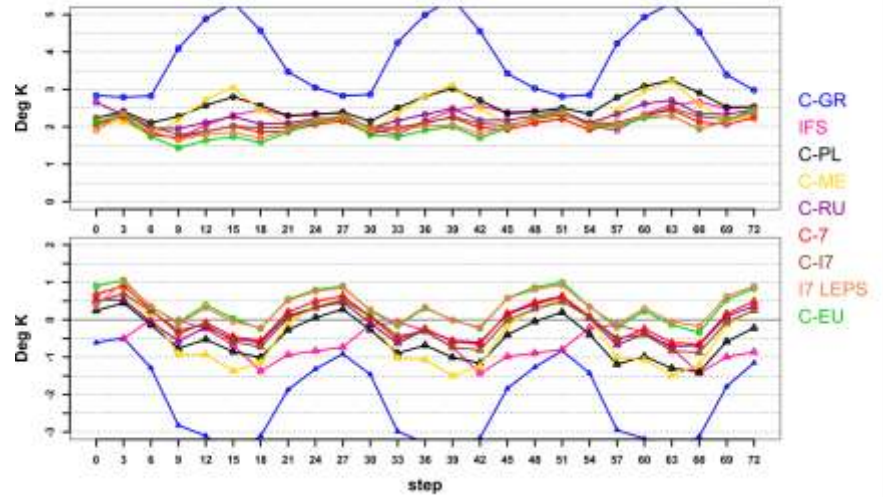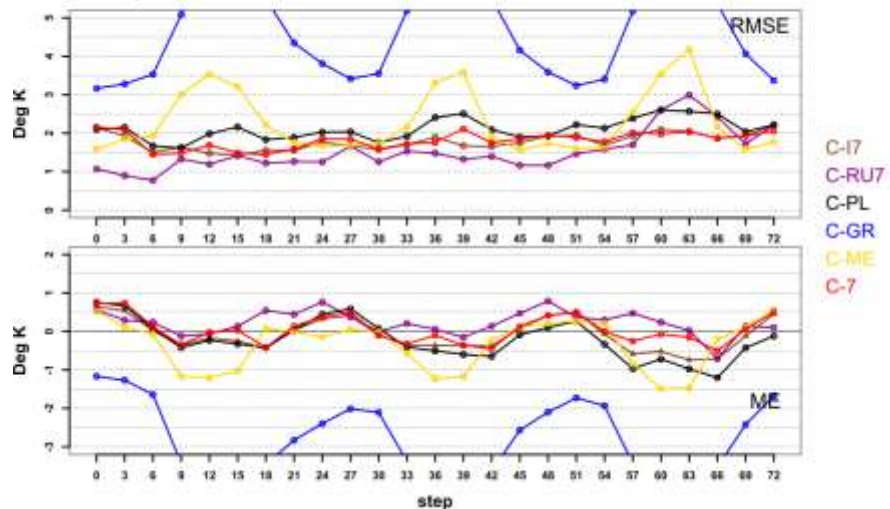
DRY

Temperature 2m MAM, Common area, All stations

ALL

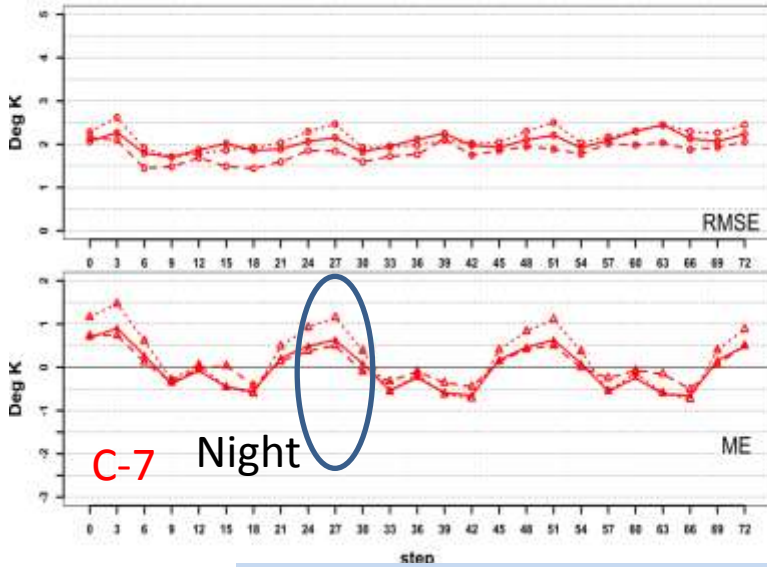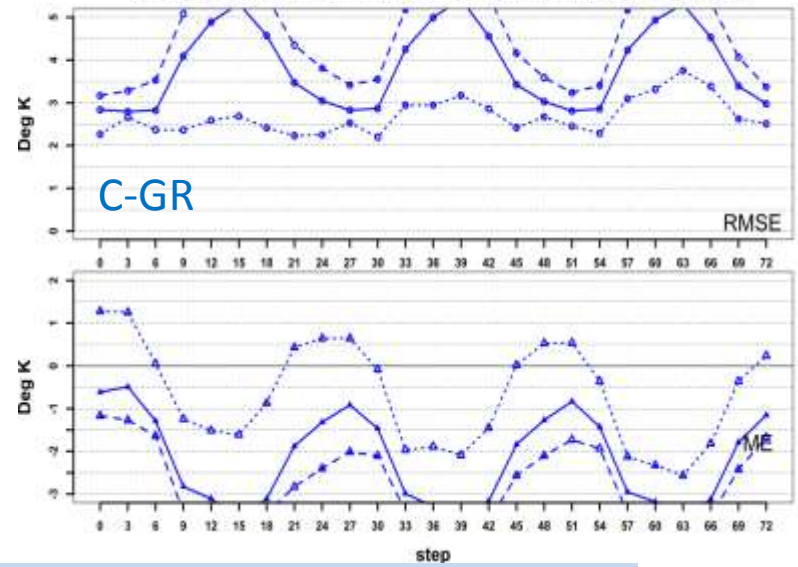Temperature 2m, Soil Water Content > 4, MAM 2015, Common area (RMSE / ME)

MOIST

MOIST cases ME diurnal cycle
is significantly smoother than DRY and ALL, Comparable RMSE, Questionable C-GR

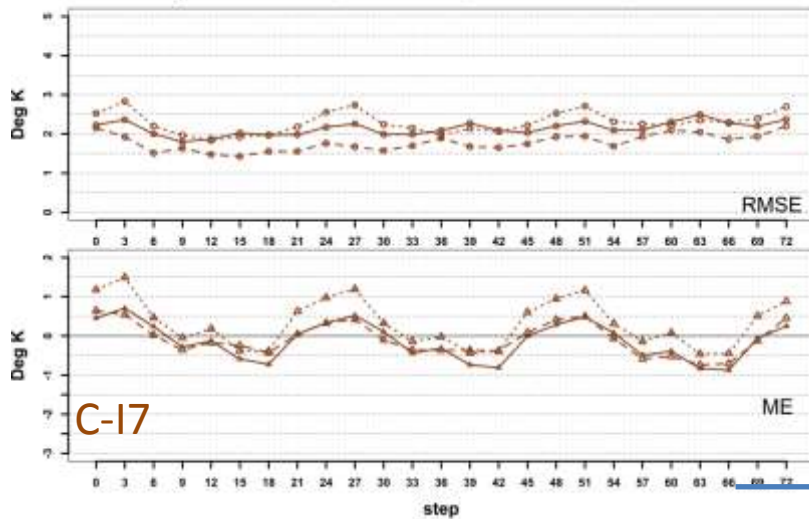Temperature CND 7, MAM 2015, Common area, All stations

C-7   Night

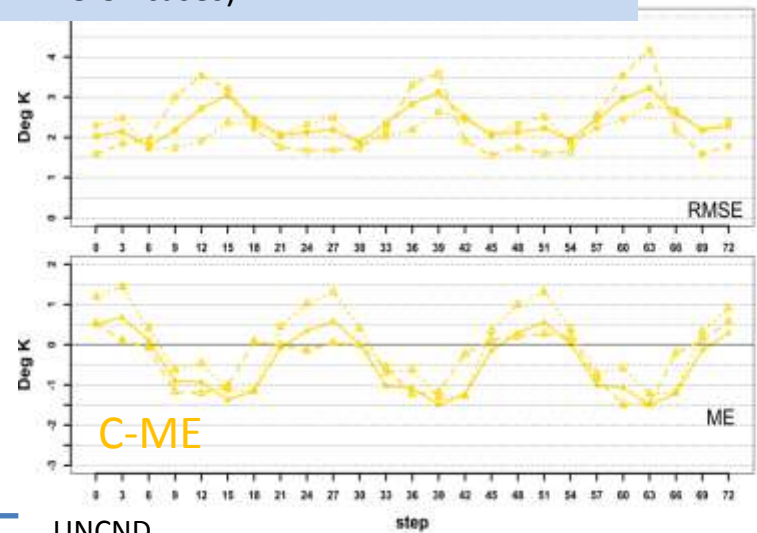Temperature CND GR MAM 2015, Common area, All stations

C-GR

DRY : ME more positive at night ,
MOIST : ME slightly less negative in the day. RMSE smaller for MOIST except for C-GR (errors come from MOIST cases).
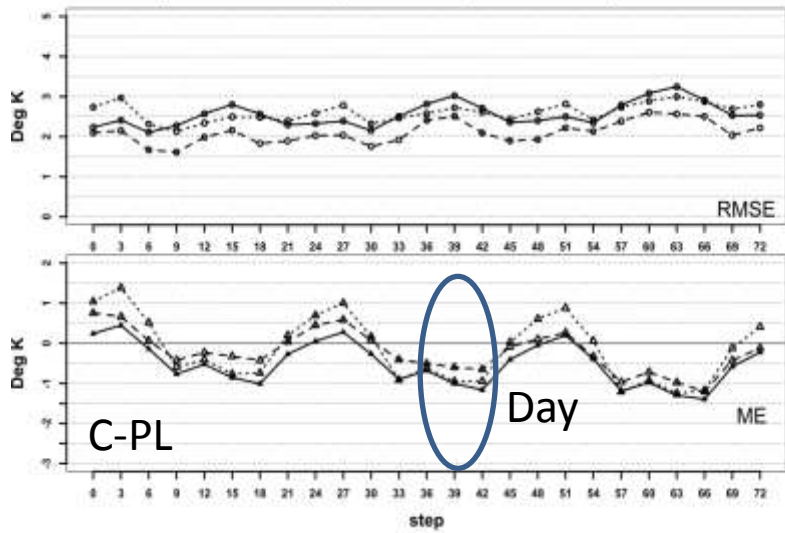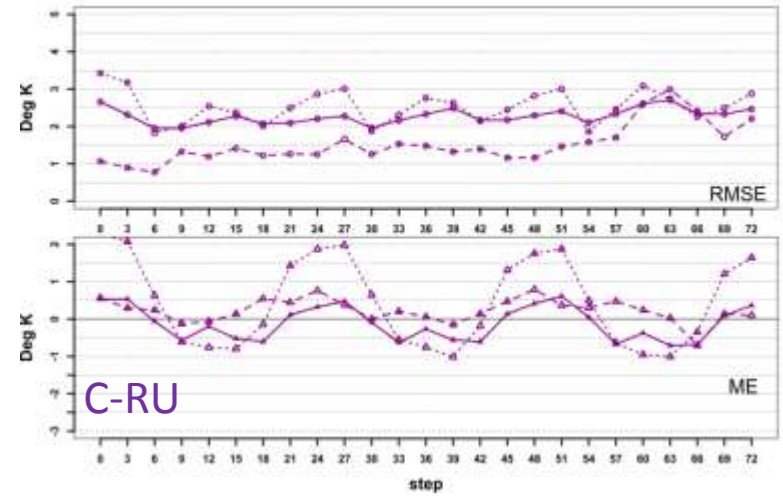
C-I7

C-ME

————— UNCND
– – – – SW>4 (MOIST)
·············· SW<2 (DRY)

Temperature CND PL, MAM 2015, Common area, All stations

RMSE

C-PL   Day   ME

step

Temperature CND RU MAM 2015, Common area, All stations

RMSE

C-RU   ME

step

———————— UNCND

— — — — — SW>4 (MOIST)

·················· SW<2 (DRY)

Conclusions for Temperatures

- Diurnal cycles comparable for JJA, weaker for MOIST the remaining seasons.

- DRY has bigger positive ME at NIGHT (overestimation increases for all seasons, but DJF trend not so clear)

- MOIST slightly more positive ME in the DAY (less underestimation) but not in JJA

- RMSE smaller for MOIST

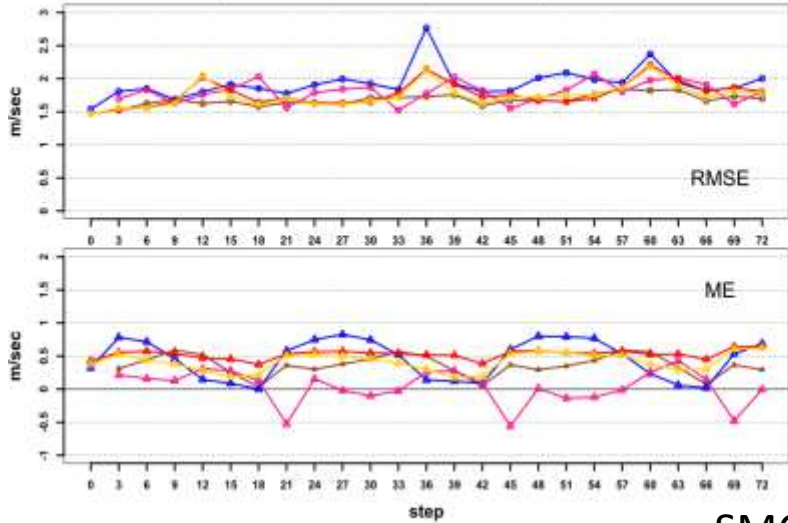- Errors in C-GR may come from MOIST cases.

Wind Speed

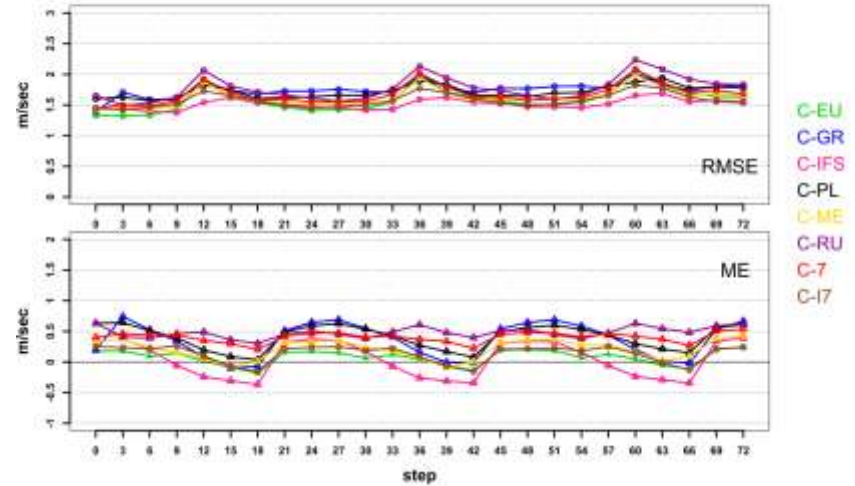## Summer 2014 (JJA)

C-I7
C-GR
IFS
C-7
C-ME

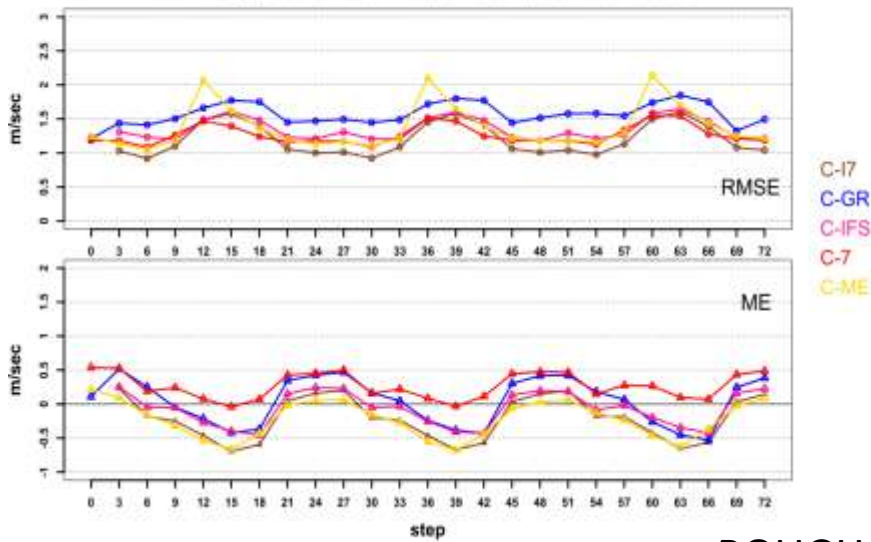Wind Speed 10m Z0 <0.2m , JJA 2014, Common area

SMOOTH

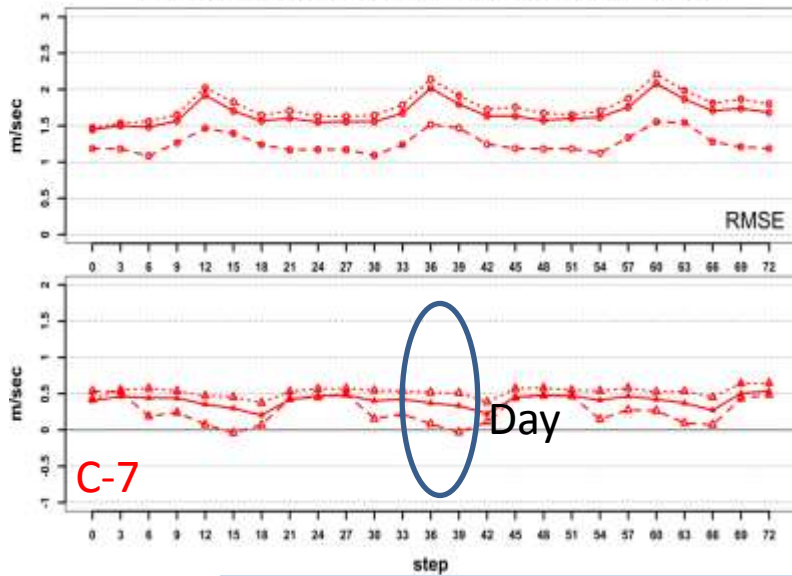Wind Speed 10m, JJA 2014, Common area, All Stations
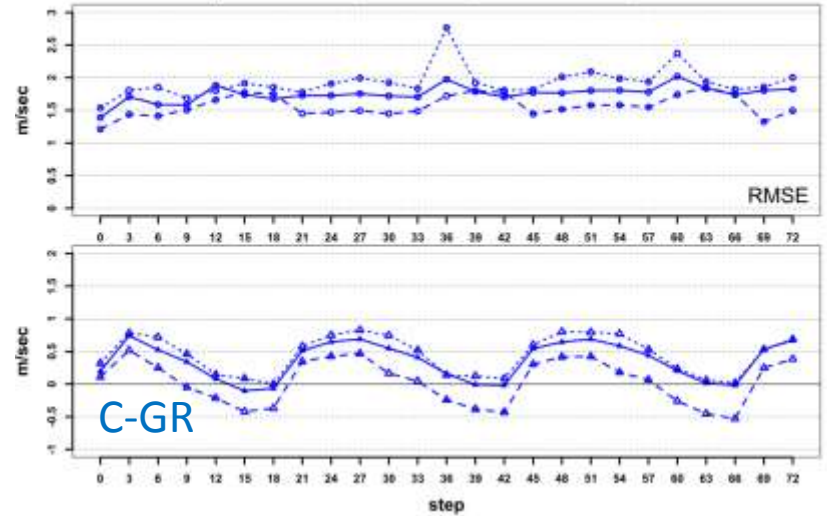
ALL

Wind Speed 10m Z0 > 1 ,JJA 2014, Common area

ROUGH

ROUGH is similar to ALL
With tendency to underestimate in the day

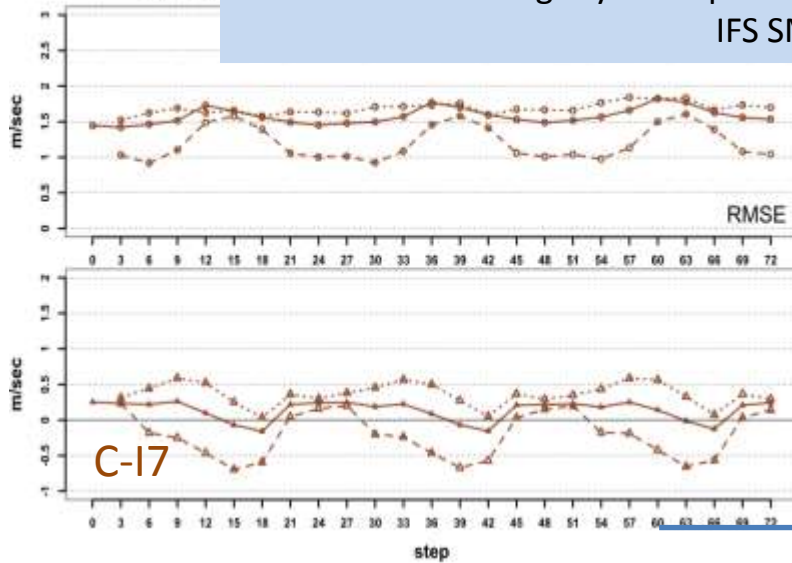Wind Speed CND 7, JJA 2014, Common area, All stations

RMSE

C-7

Day

step

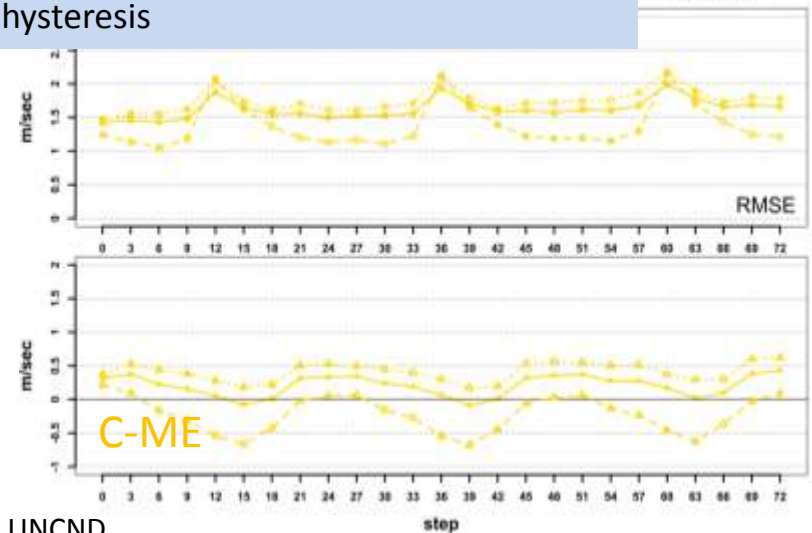Wind Speed CND GR, JJA 2014, Common area, All stations

RMSE

C-GR

step

ROUGH : ME more negative in the day
SMOOTH: slightly more positive for all times. RMSE smaller for ROUGH.
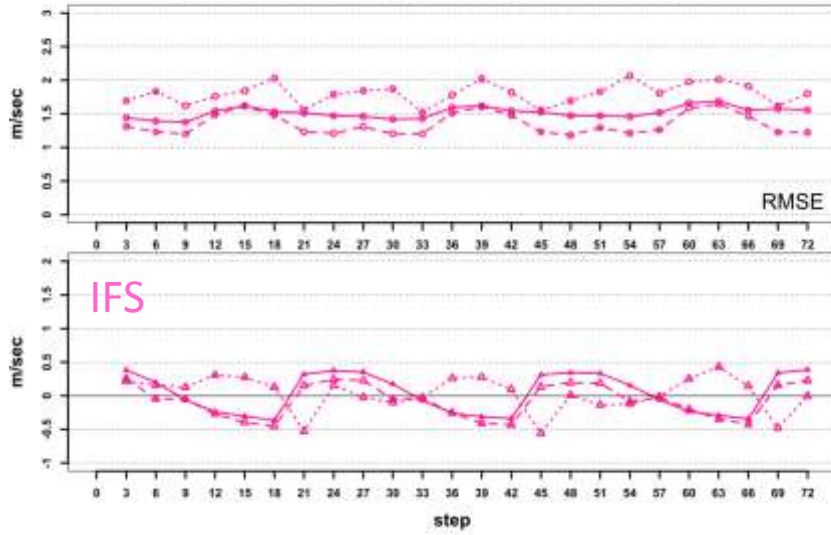IFS SMOOTH hysteresis

Wind Sp...

RMSE

C-I7

step

All stations

RMSE

C-ME

step

UNCND
Z0 >1 (ROUGH)
Z0 <0.2 (SMOOTH)

Wind Speed CND ECMWF, JJA 2014, Common area, All stations

IFS

RMSE

	UNCND
	Z0 >1 (ROUGH)
	Z0 <0.2 (SMOOTH)

Wind Speed

Fall 2014 (SON)

C-I7
C-GR
IFS
C-7
C-ME
C-PL

Wind Speed 10m Z0 <0.2m , SON 2014, Common area
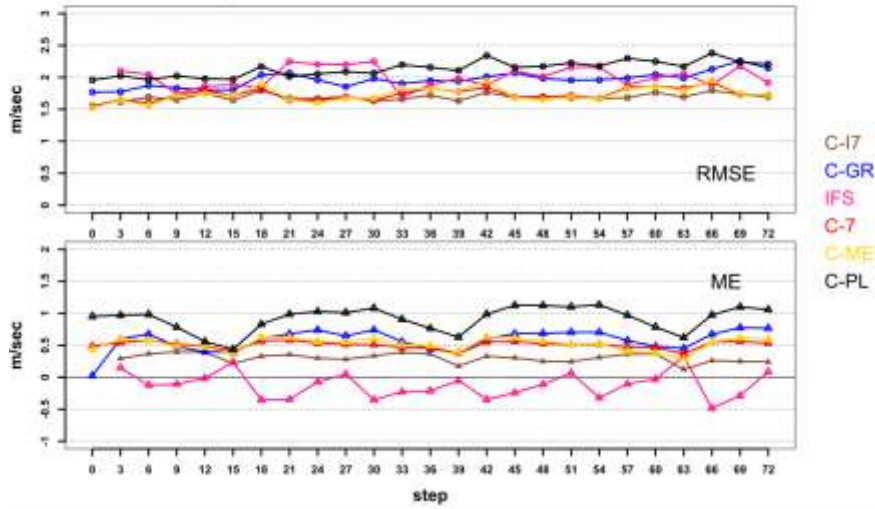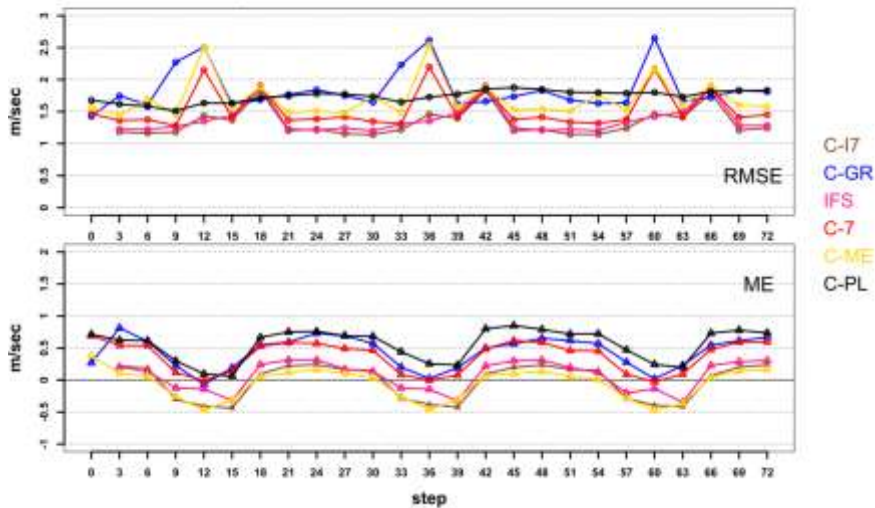
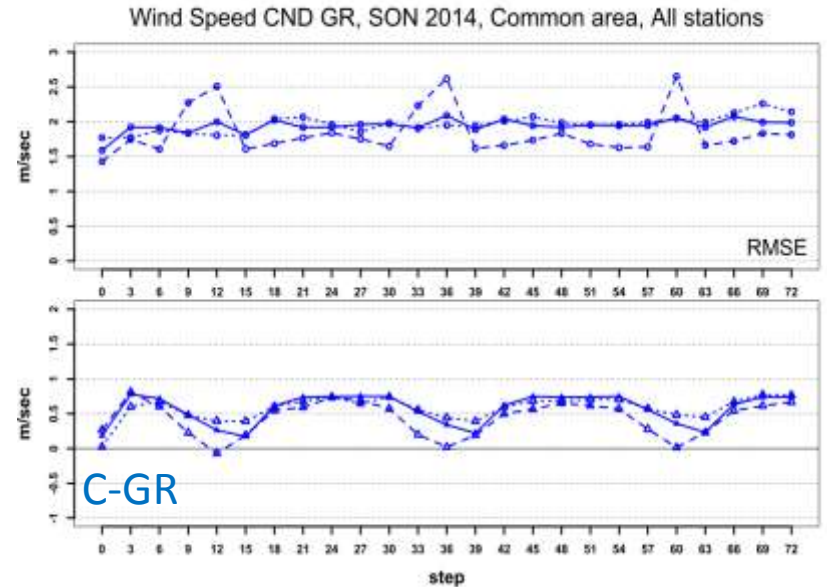SMOOTH

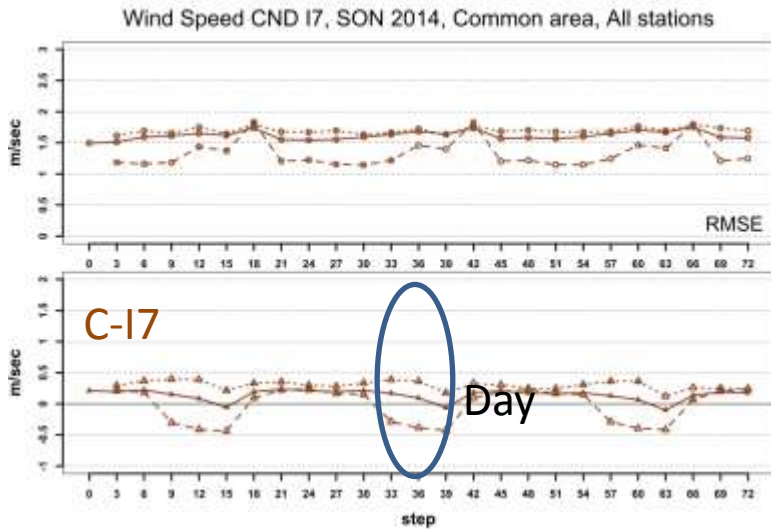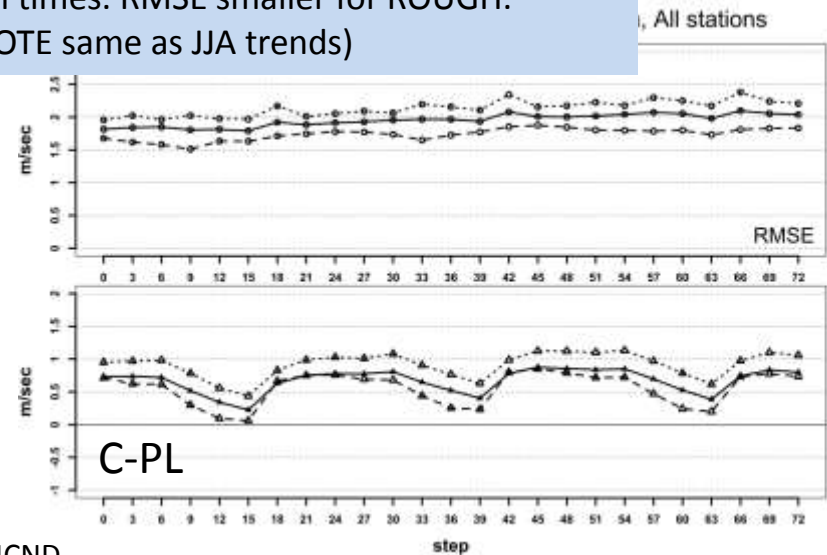Wind Speed 10m, SON 2014, Common area, All Stations

ALL
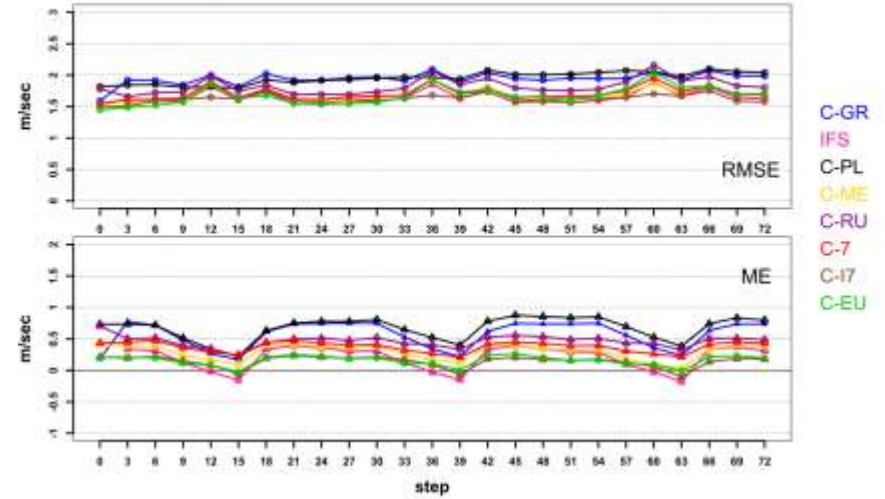
Wind Speed 10m Z0 > 1 ,SON 2014, Common area

ROUGH

ROUGH ME is similar to ALL, With tendency to underestimate in the day.
SMOOTH weaker cycle
ROUGH RMSE peaks.

Wind Speed CND I7, SON 2014, Common area, All stations

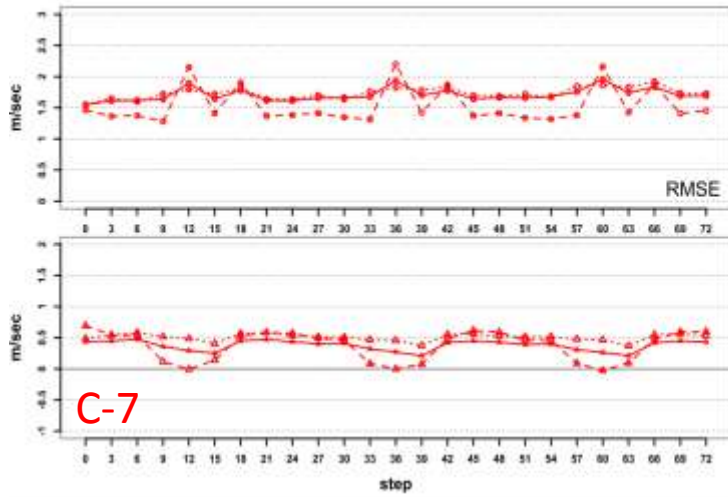Wind Speed CND GR, SON 2014, Common area, All stations

C-I7

Day

C-GR

ROUGH : ME more negative in the day
SMOOTH: slightly more positive for all times. RMSE smaller for ROUGH.
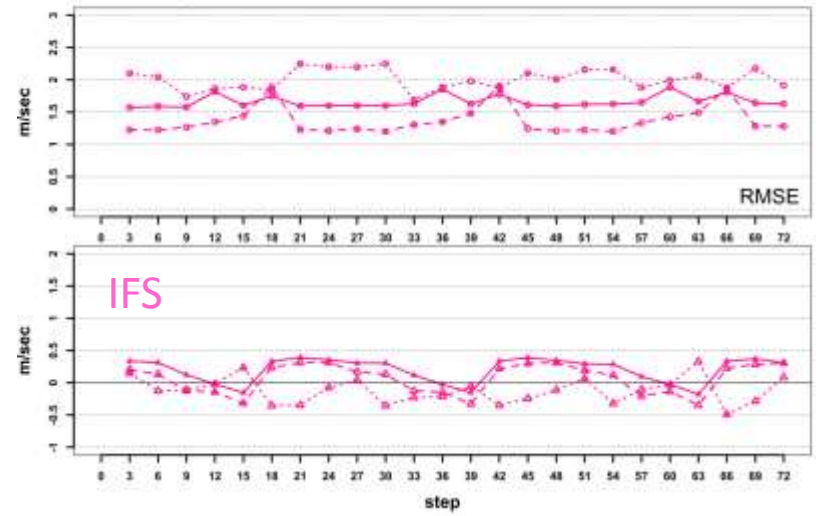IFS SMOOTH hysteresis (NOTE same as JJA trends)

Wind Spe... , All stations

C-ME

C-PL
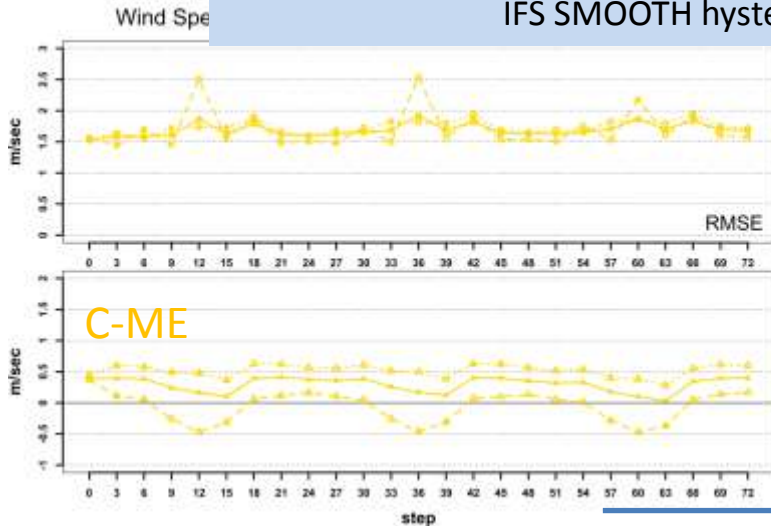
UNCND

Z0 >1 (ROUGH)

Z0 <0.2 (SMOOTH)

Wind Speed CND 7, SON 2014, Common area, All stations

Wind Speed CND ECMWF, SON 2014, Common area, All stations

RMSE

C-7

IFS

RMSE

	UNCND
	Z0 >1 (ROUGH)
	Z0 <0.2 (SMOOTH)

Wind Speed

Winter 2014-15 (DJF)

C-I7
C-GR
IFS
C-7
C-ME
C-PL
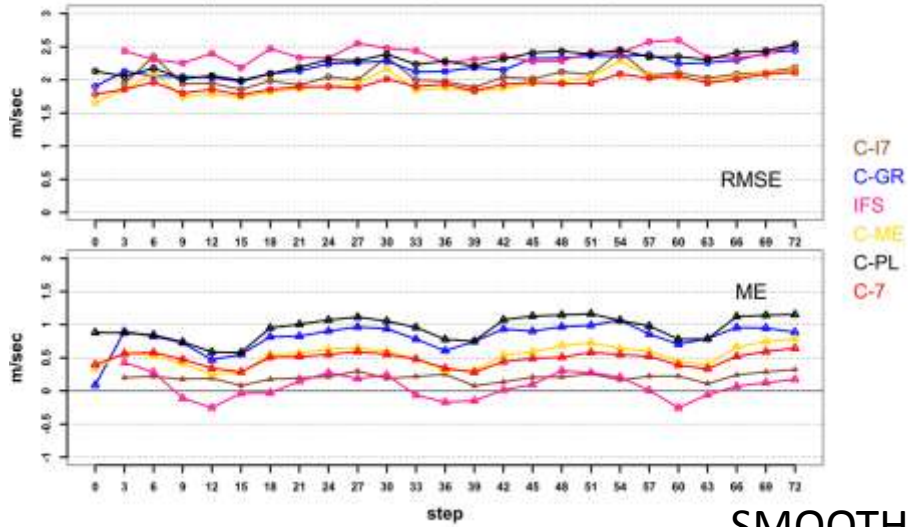
SMOOTH

ALL
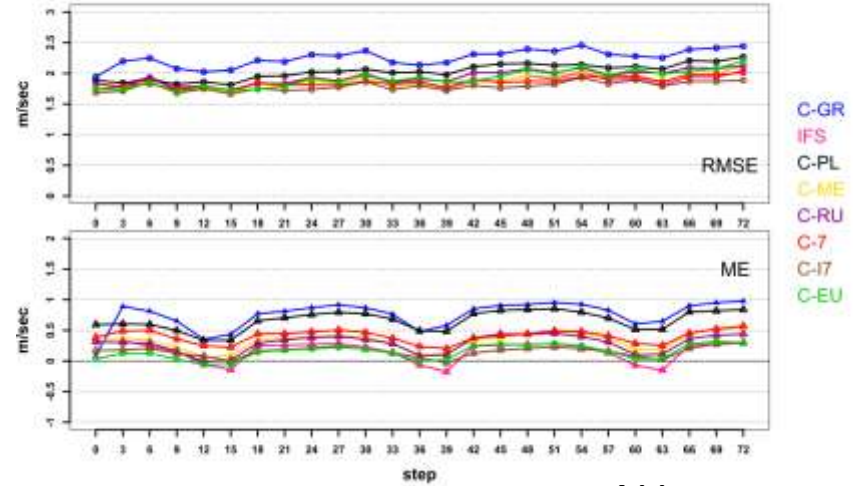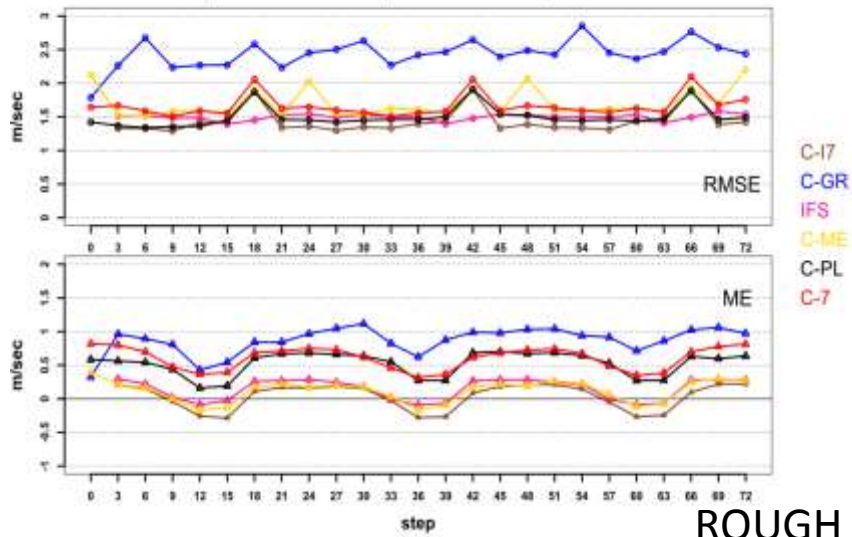
ROUGH

ROUGH and SMOOTH ME cycles are now similar to ALL
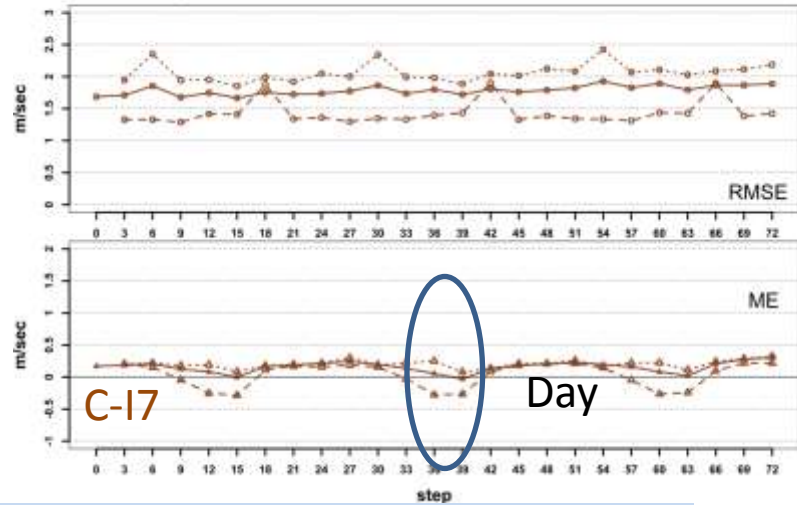
Wind Speed CND GR, DJF 2014-2015, Common area, All stations
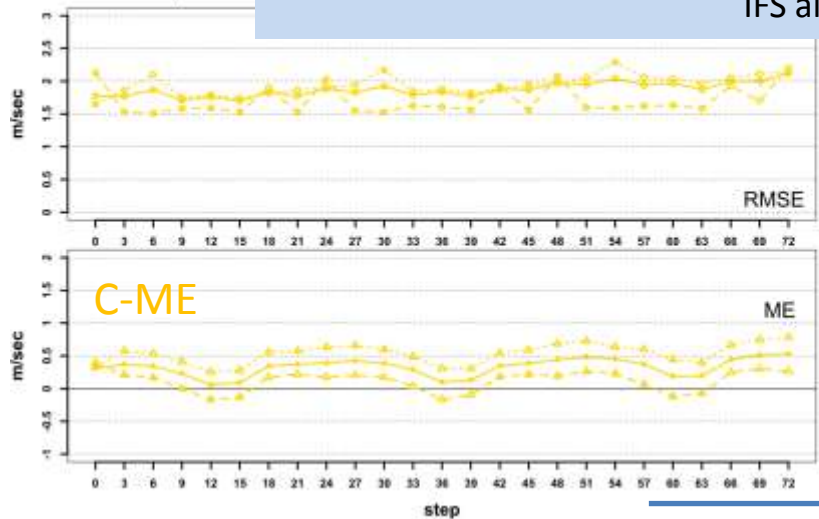
RMSE

ME

C-GR
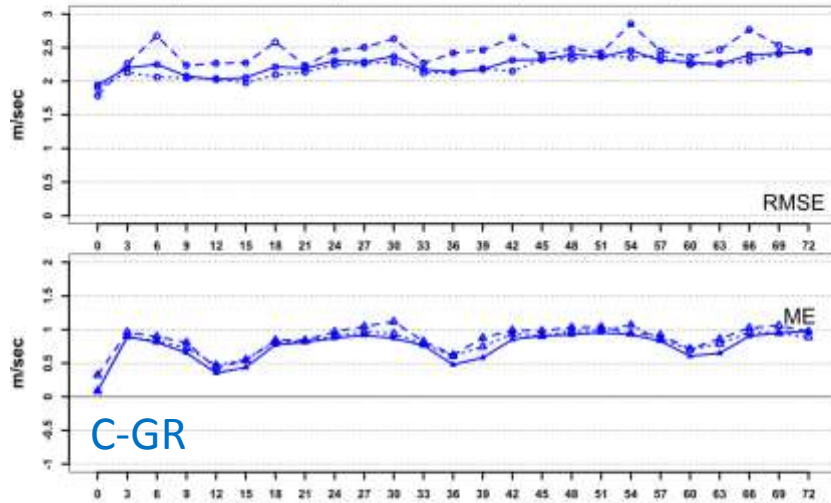
Wind Speed CND I7, DJF 2014-2015, Common area, All stations
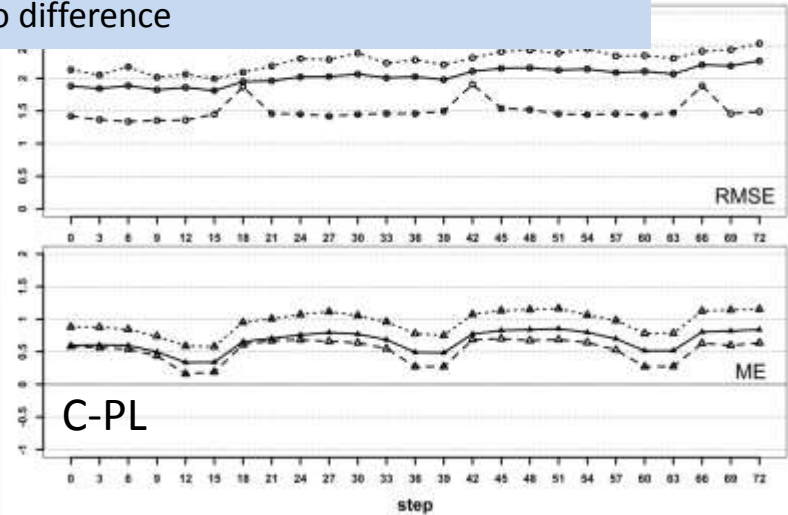
RMSE

ME

C-I7   Day

ROUGH : ME more negative in the day (less than previous seasons)
but NOT for C-7, C-GR
SMOOTH: ME slightly more positive for all times. RMSE smaller for ROUGH.
IFS almost no difference

Wind Speed CN...   ...ll stations

RMSE

C-ME

ME

RMSE

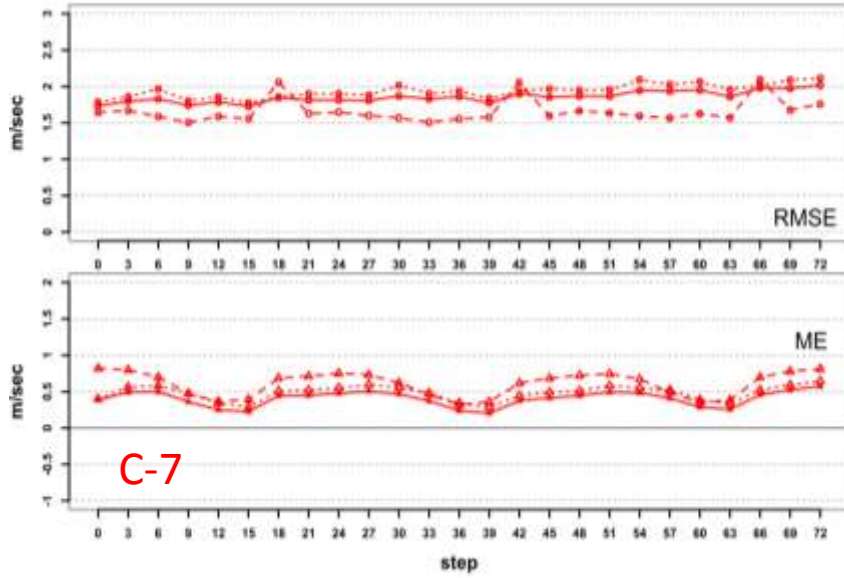ME

C-PL

step

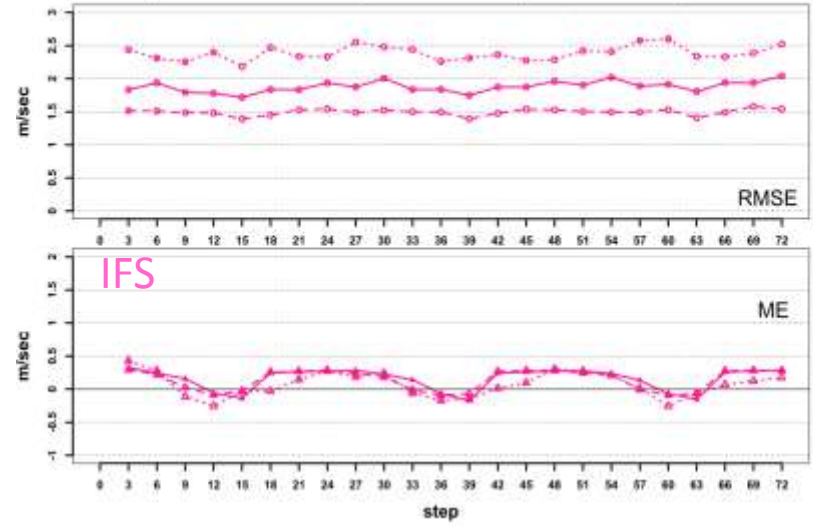step

step

_____ UNCND

– – – – – – –   Z0 >1 (ROUGH)

.... Z0 <0.2 (SMOOTH)

Wind Speed CND 7, DJF 2014-2015, Common area, All stations

Wind Speed CND ECMWF, DJF 2014-2015, Common area, All stations

————	UNCND
– – – – –	Z0 >1 (ROUGH)
··············	Z0 <0.2 (SMOOTH)

Wind Speed

Spring 2015 (MAM)

C-I7
C-GR
IFS
C-7
C-ME
C-PL

Wind Speed 10m Z0 <0.2m , MAM 2015, Common area

C-I7
C-GR
IFS
C-ME
C-PL
C-7

RMSE

ME
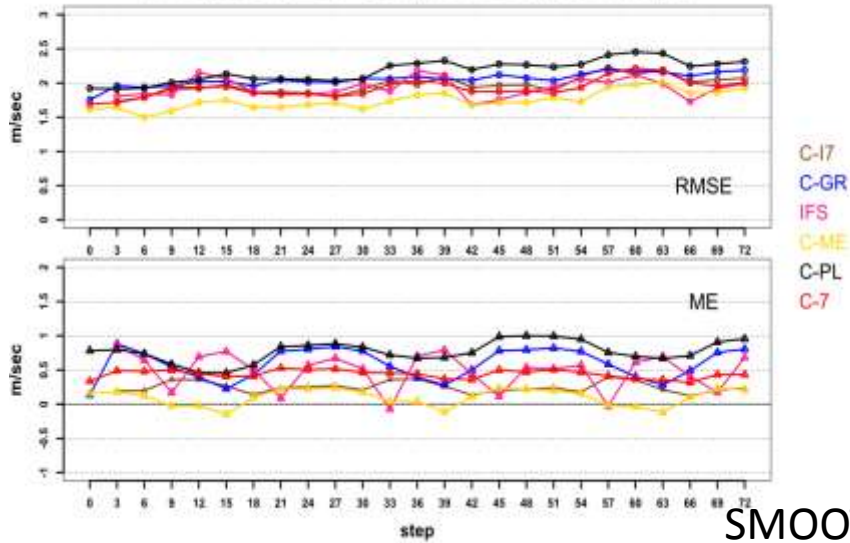
SMOOTH

Wind Speed 10m, MAM 2015, Common area, All Stations

C-GR
IFS
C-PL
C-ME
C-RU
C-7
C-I7
C-EU
I7-LEPS

RMSE

ME

ALL
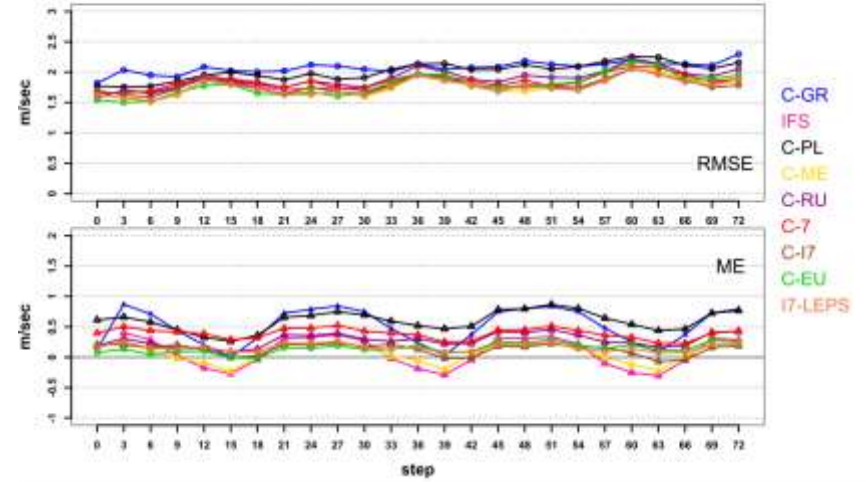
Wind Speed 10m Z0 > 1 ,MAM 2015, Common area

C-I7
C-GR
IFS
C-ME
C-PL
C-7

RMSE

ME
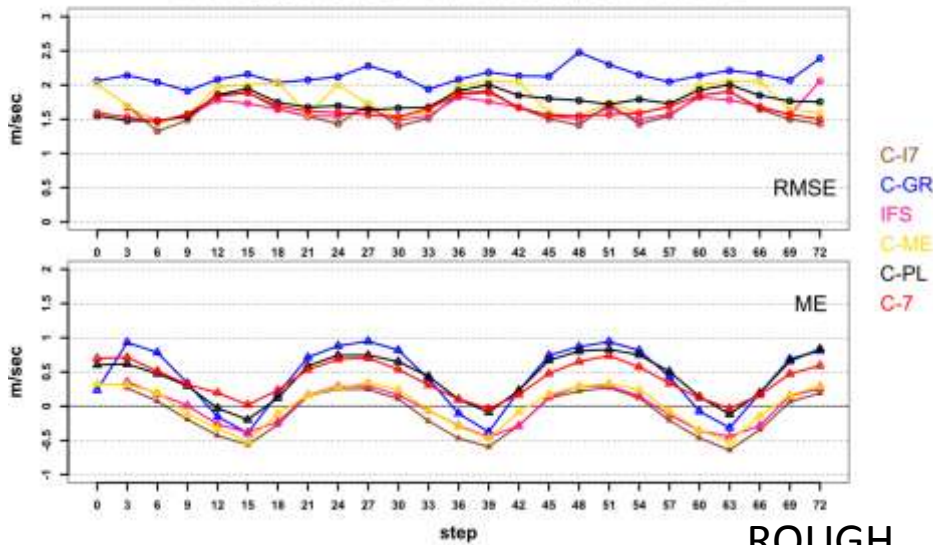
ROUGH

ROUGH ME cycle is sharper.
SMOOTH weaker cycle

Wind Speed CND 7, MAM 2015, Common area, All stations

RMSE
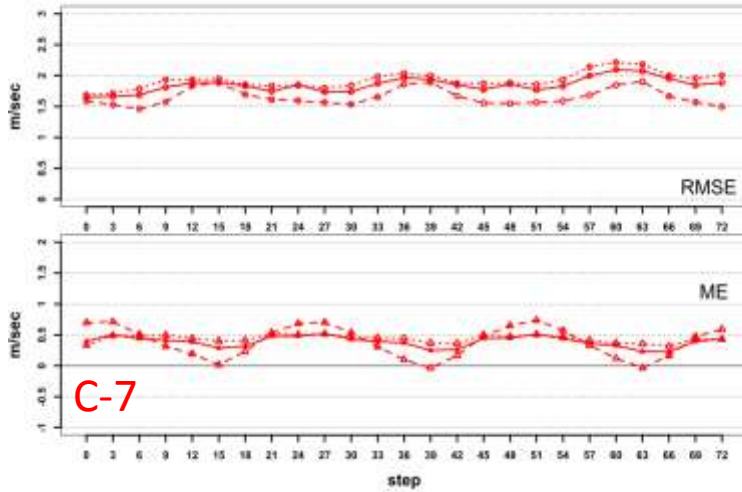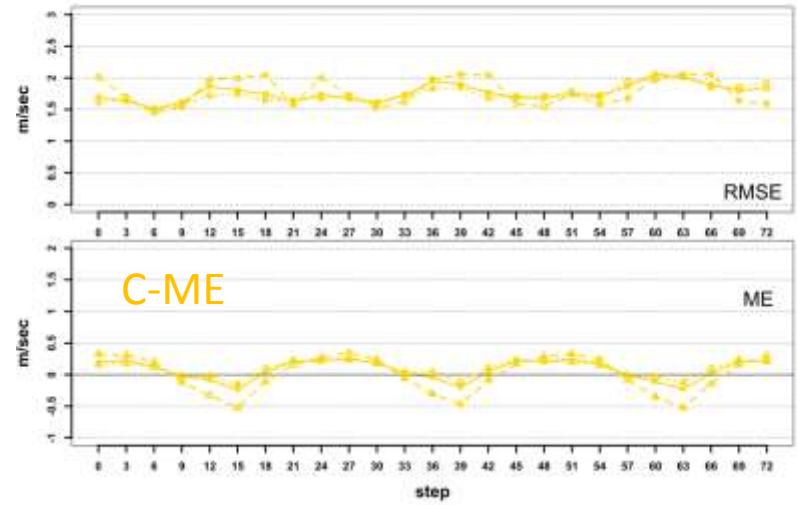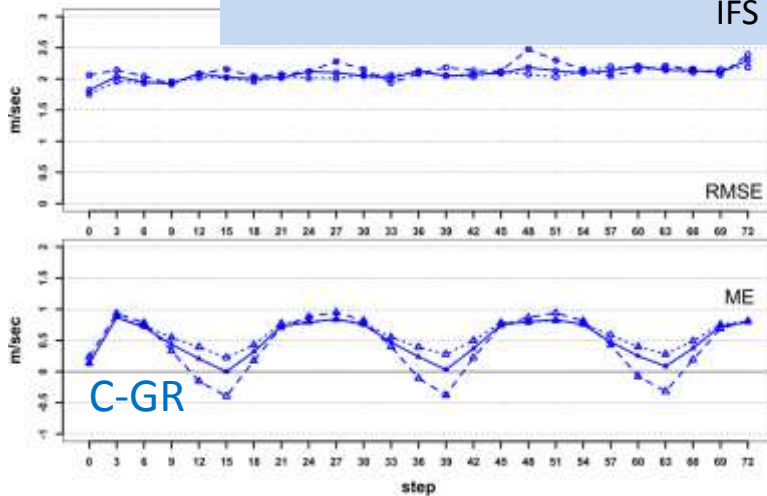
ME

C-7

Wind Speed CND ME, MAM 2015, Common area, All stations

RMSE
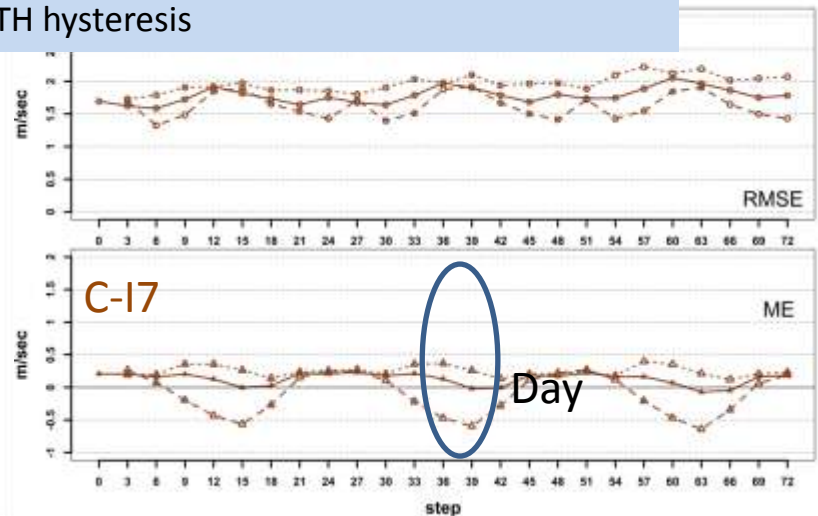
C-ME

ME

ROUGH : ME more negative in the day
SMOOTH: slightly more positive in the day. RMSE smaller for ROUGH.
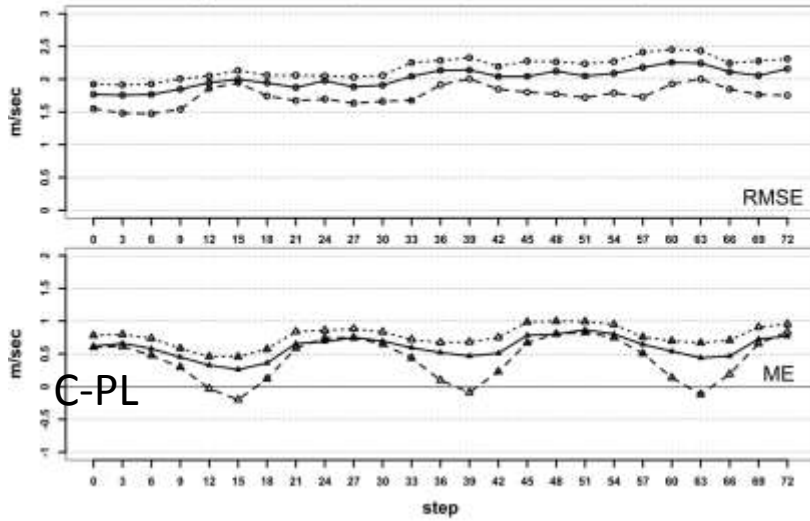IFS SMOOTH hysteresis

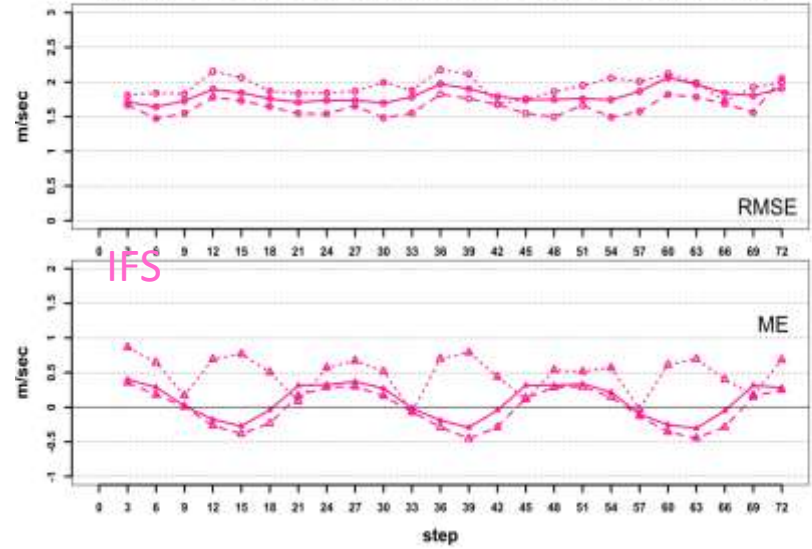Wind Spee...   ...stations

RMSE

ME

C-GR

RMSE

C-I7

ME

Day

UNCND
Z0 >1 (ROUGH)
Z0 <0.2 (SMOOTH)

Wind Speed CND PL, MAM 2015, Common area, All stations

Wind Speed CND ECMWF, MAM 2015, Common area, All stations

RMSE

RMSE

IFS

ME

C-PL

ME

step

step

UNCND
Z0 >1 (ROUGH)
Z0 <0.2 (SMOOTH)

Conclusions for Wind Speed

- ROUGH cases : tendency of underestimation during the day, which is weaker for winter season.

- SMOOTH cases: tendency of slight overestimation, overall distributed equally in the daily cycle

- RMSE reduced for ROUGH and slightly bigger for SMOOTH

- IFS SMOOTH significant overestimation in the day (hysteresis), not found in DJF

THANK YOU FOR YOUR ATTENTION.
Any Questions ?