

TESTING THE RADIATION SCHEME

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- CONTROL RUN
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OBJECTIVE

- To test the new radiation scheme RRTM
 - To look for possible bugs
 - To compare with default radiation scheme

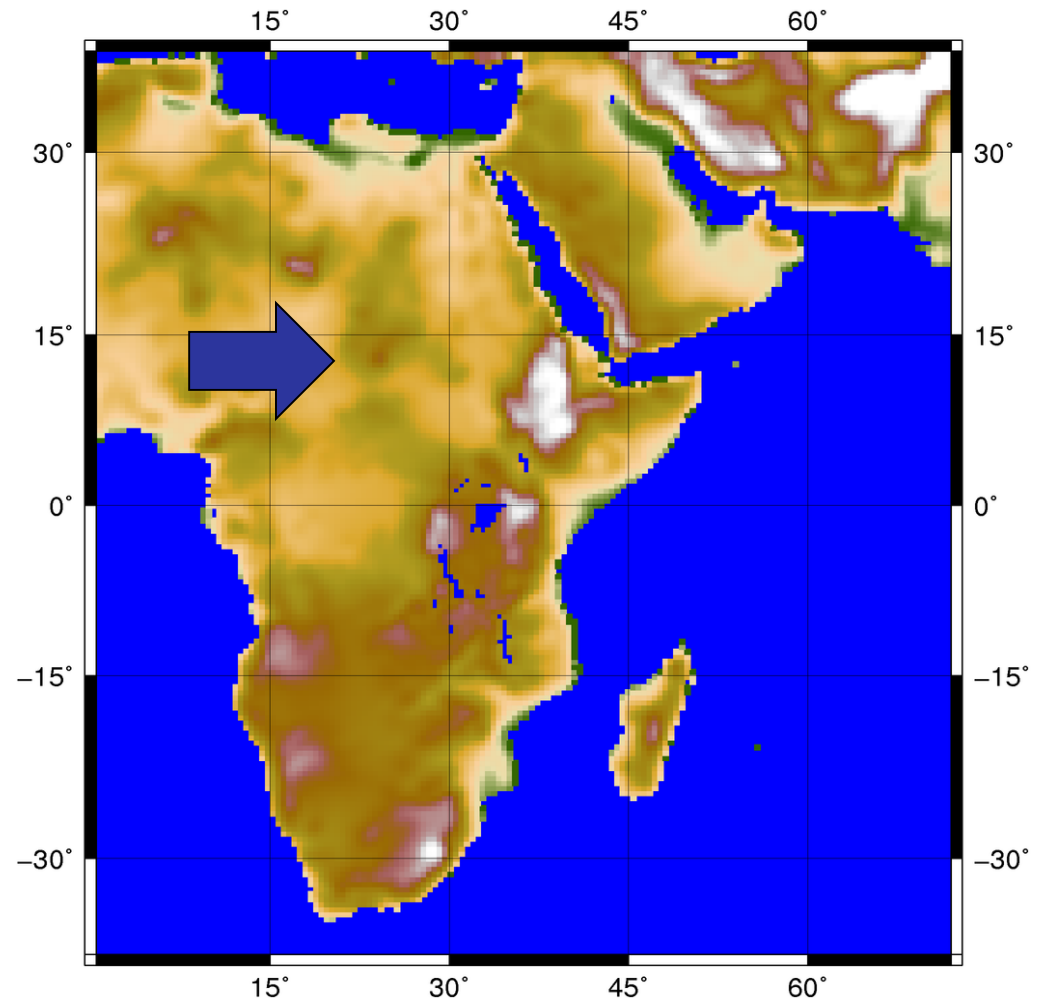
SIMULATION SET-UP

1. CONTROL RUN

- Size :180 x 160
- $kz = 18$
- Projection = NORMER
- Resolution = 50.0
- SST Type = OI_WK
- Data Type = EIN15
- 20050101-20050401

2. O₃ RUN

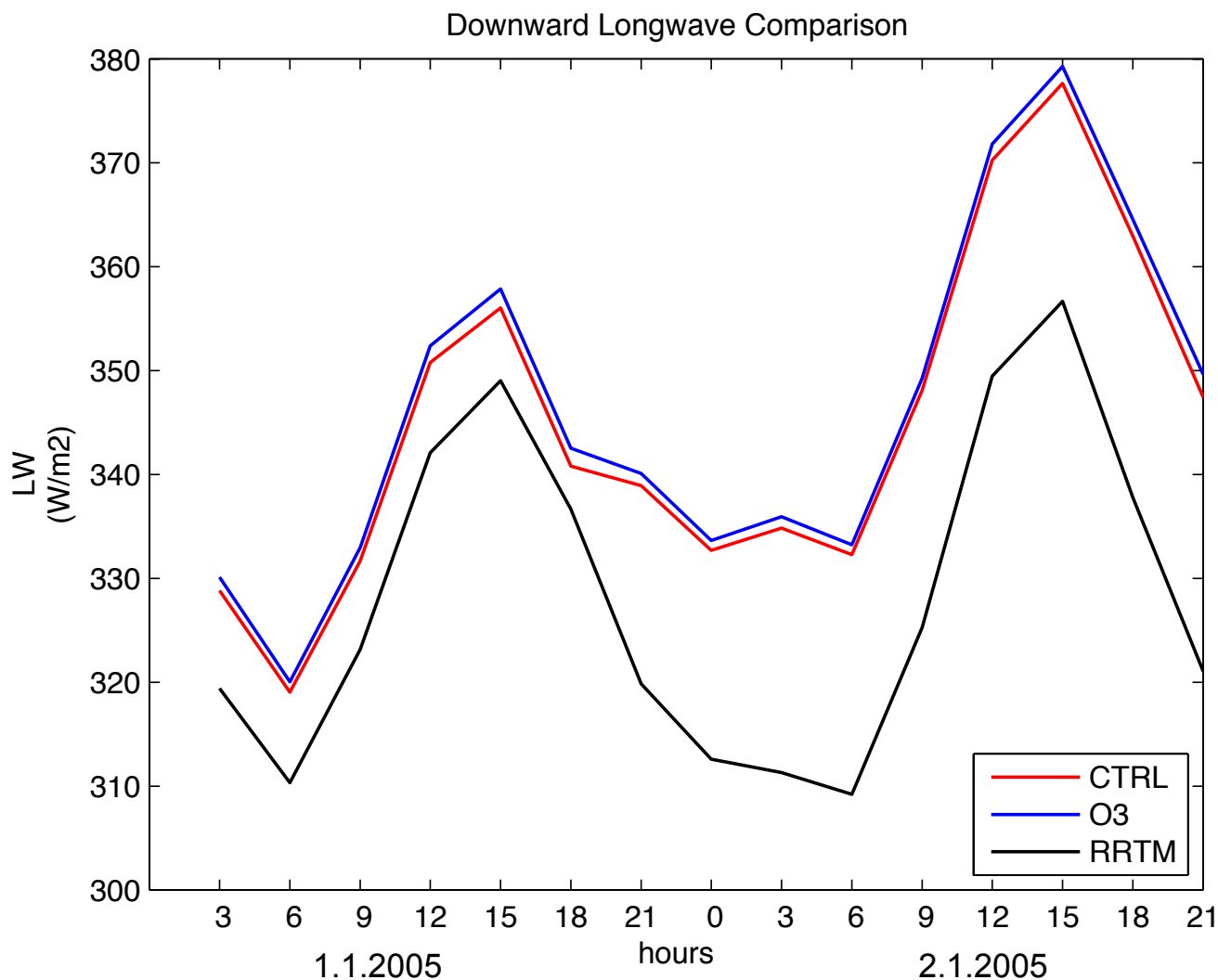
3. RRTM & O₃ RUN



RESULTS: Bugs

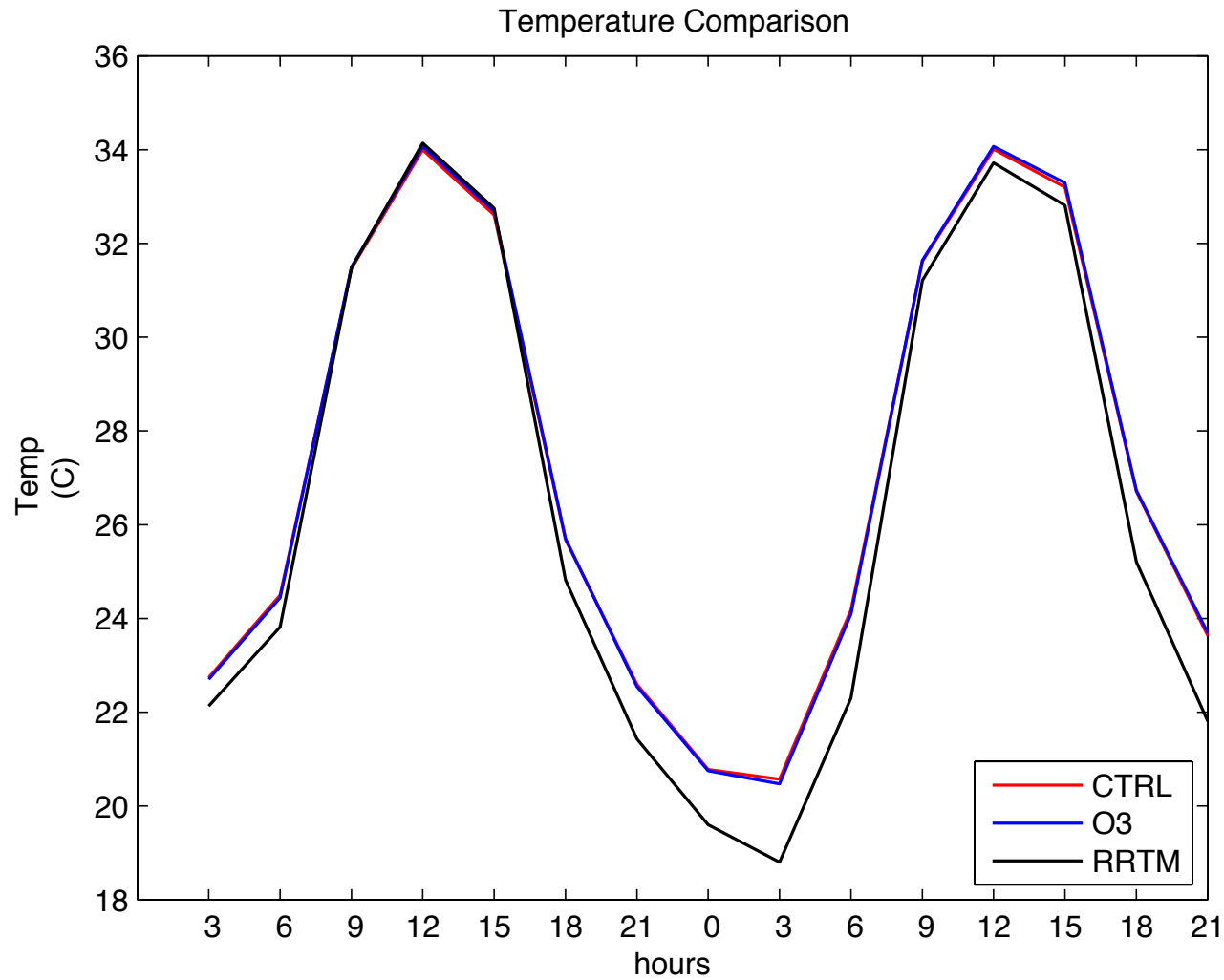
- Problem in the coupling: RRTM was not properly reading greenhouse gases (fixed).
- Stripes in some output variables.

RESULTS : LW



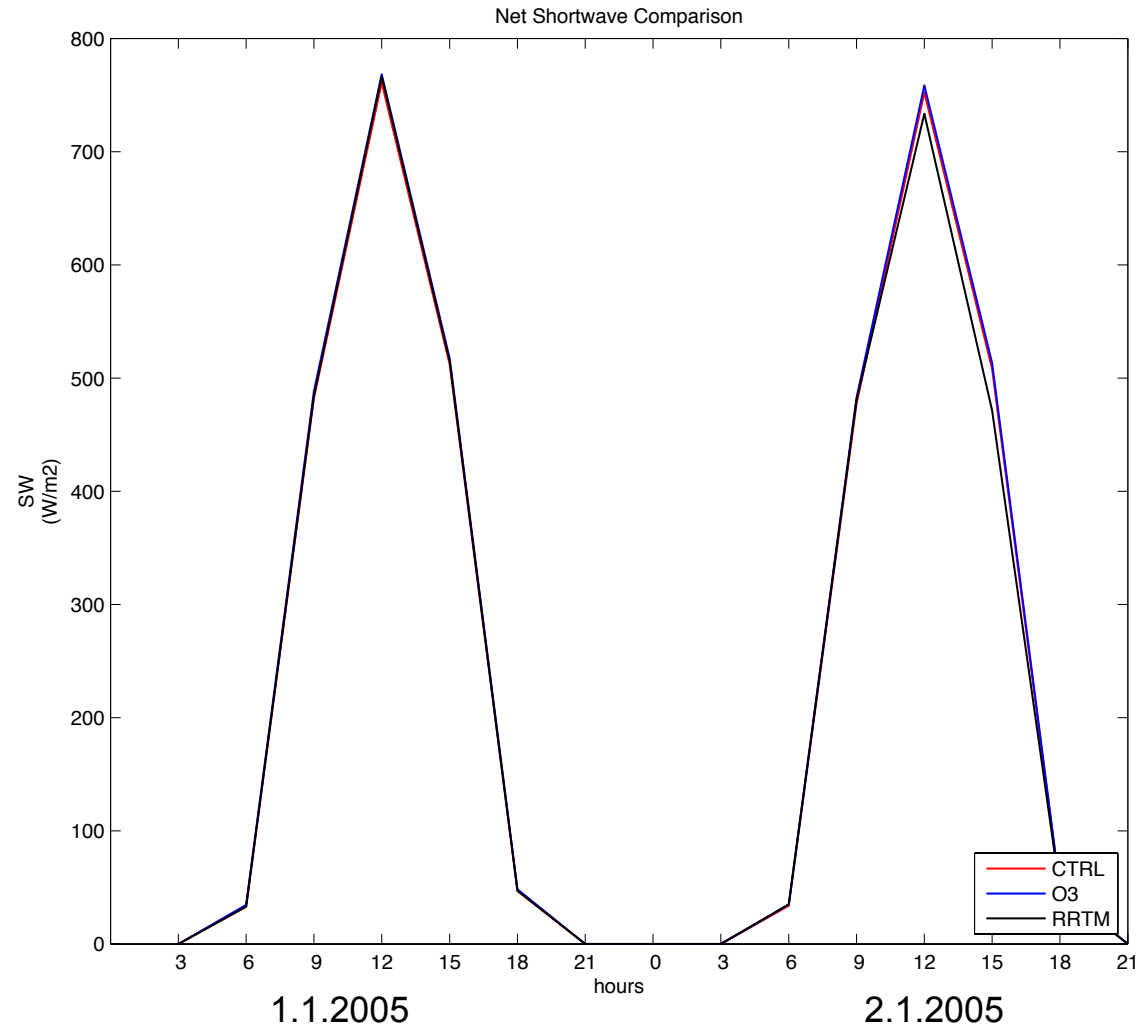
RRTM produces lower downward longwave radiation values in comparison with NCAR CCM3 radiation scheme

RESULTS : TEMPERATURE



RRTM produces lower temperature at night in comparison with NCAR CCM3 radiation scheme

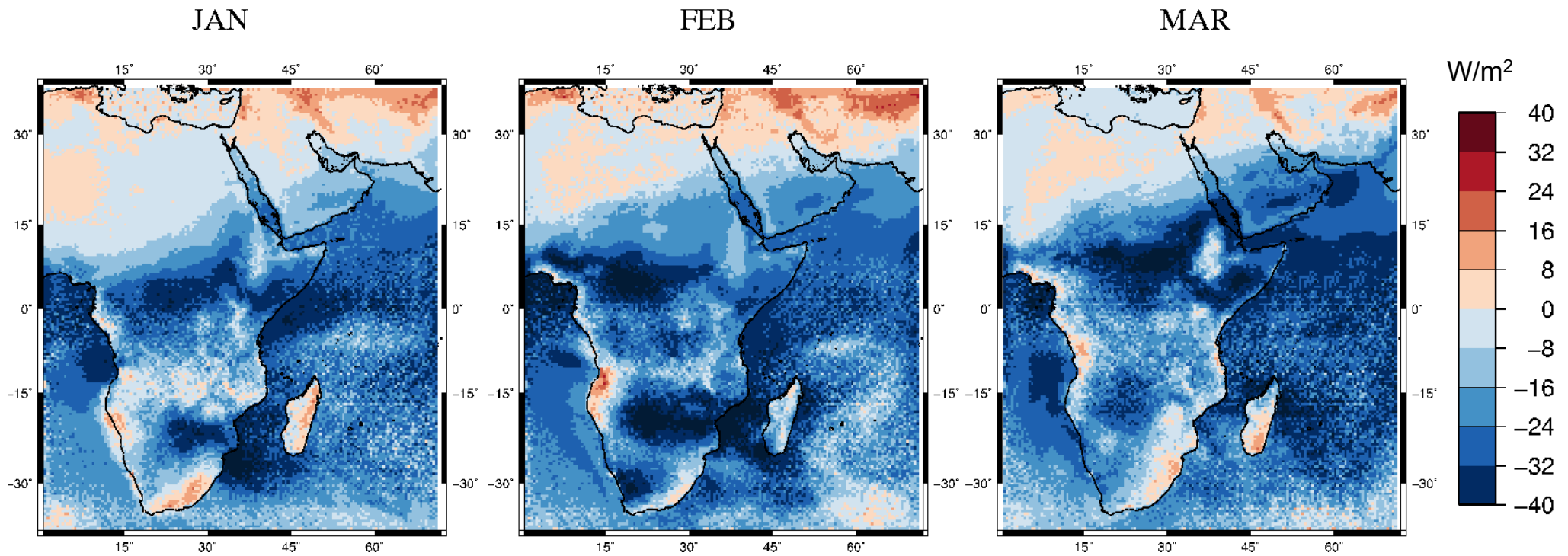
RESULTS : SW



Short wave tends to be similar in three simulations

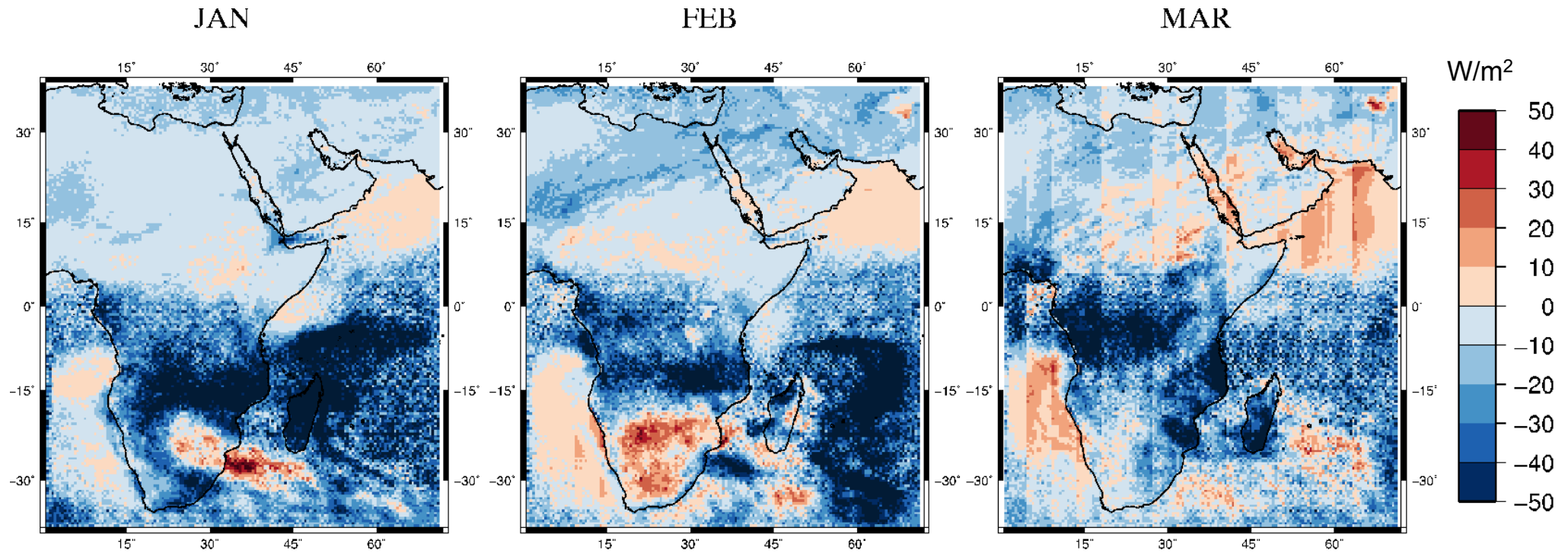
RRTM-CTRL

Longwave downward radiation at the surface



RRTM produces lower downward longwave radiation over the lower half of the domain.

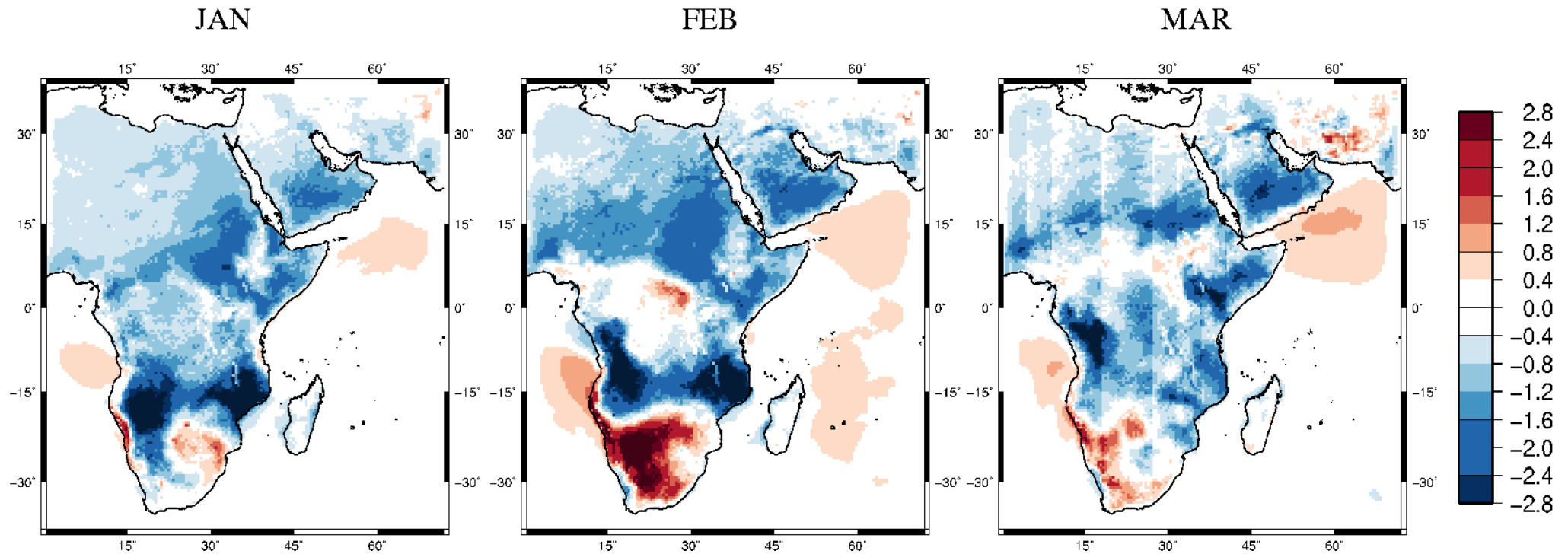
RRTM- CTRL Short Wave



The differences are mainly located in the southern half of the domain,
possibly noise related to clouds.
Suspicious stripes appeared in March

RRTM – CTRL

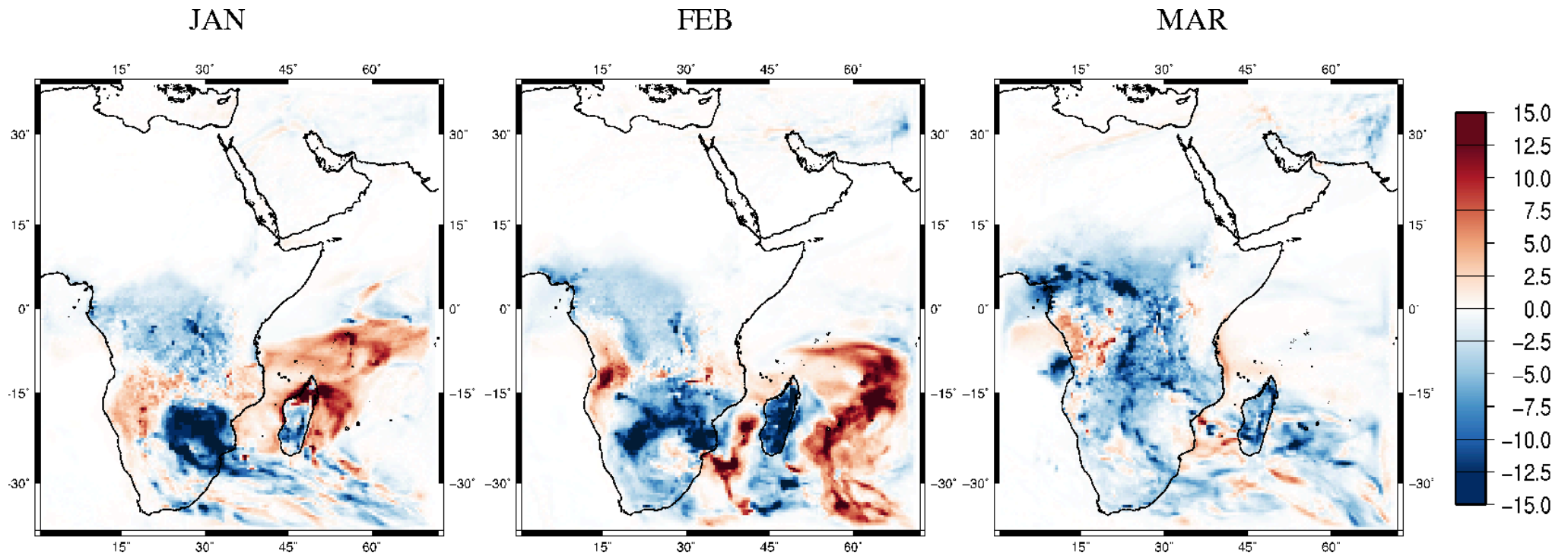
Temperature (C°)



RRTM tends to simulate generally cooler temperatures inland

RRTM-CTRL

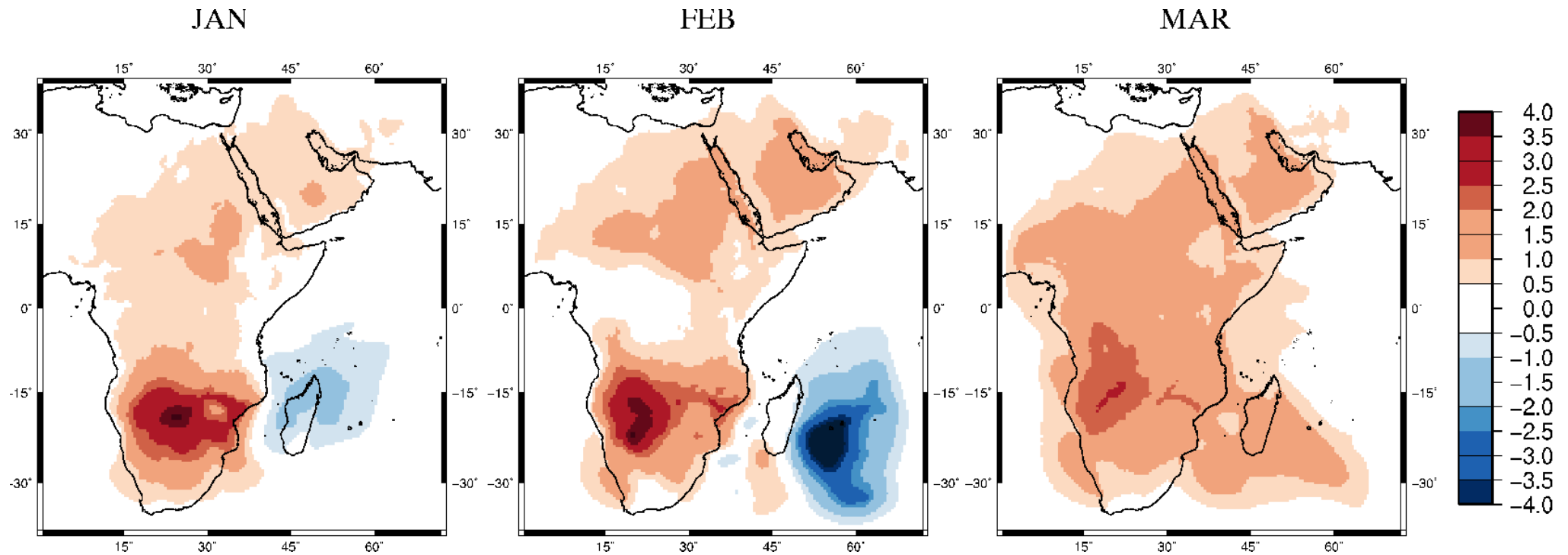
Precipitation (mm/day)



RRTM produces less rain in the monsoon area

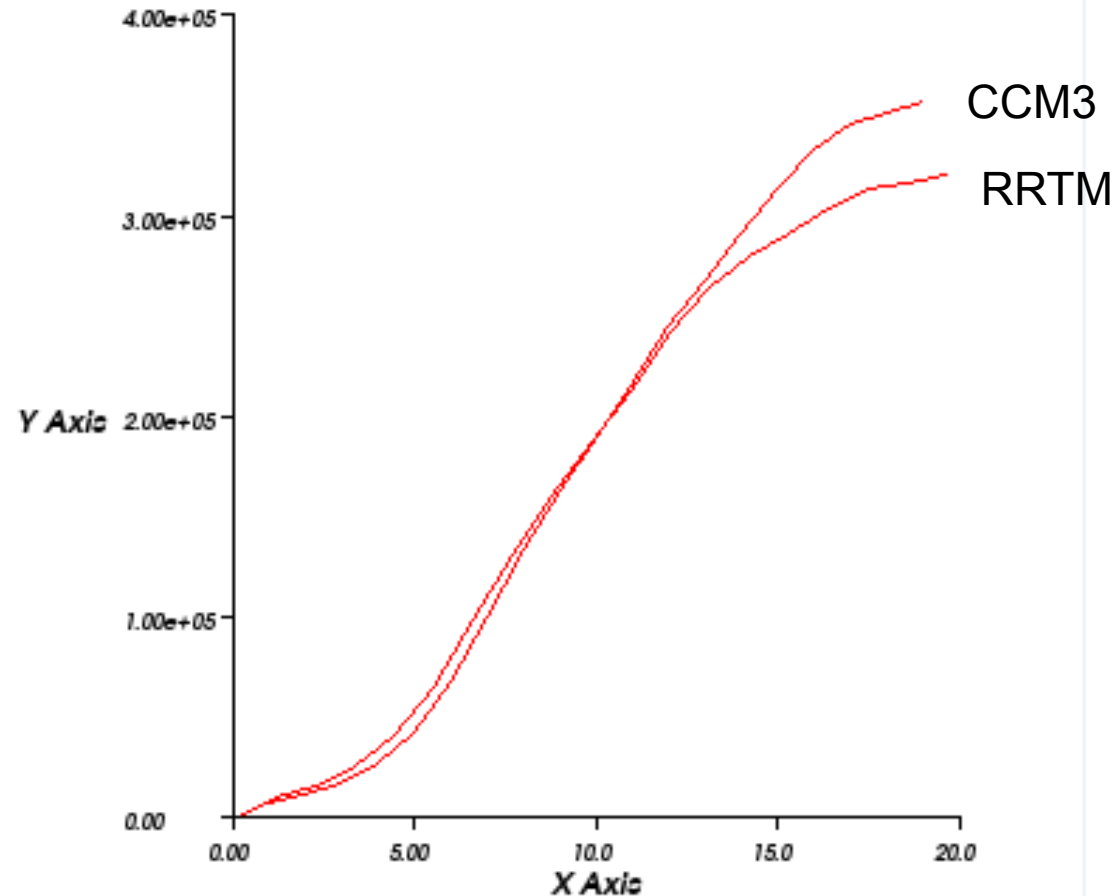
RRTM-CTRL

difference of surface pressure



RRTM produces higher pressure inland, related to the cold bias. Monsoon wind would be weaker.

Downward LW radiation profile



A difference has been found in the downward LW radiation in TOA. It is 0 for RRTM but few watts for CCM3. Could this affect to the surface?

CONCLUSIONS

- Some bugs have been found and are being fixed.
- RRTM seems to be giving cooler conditions, and these affect to the monsoon.
- Cooling is caused by differences in the downward longwave radiation.
- This differences may be related to the differences found in the TOA.