

An Evaluation of Integrated Cloud Condensate in MÉRA

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MÉRA workshop 2019



OÉ Gaillimh
NUI Galway



Coláiste na Tríonóide, Baile Átha Cliath
Trinity College Dublin
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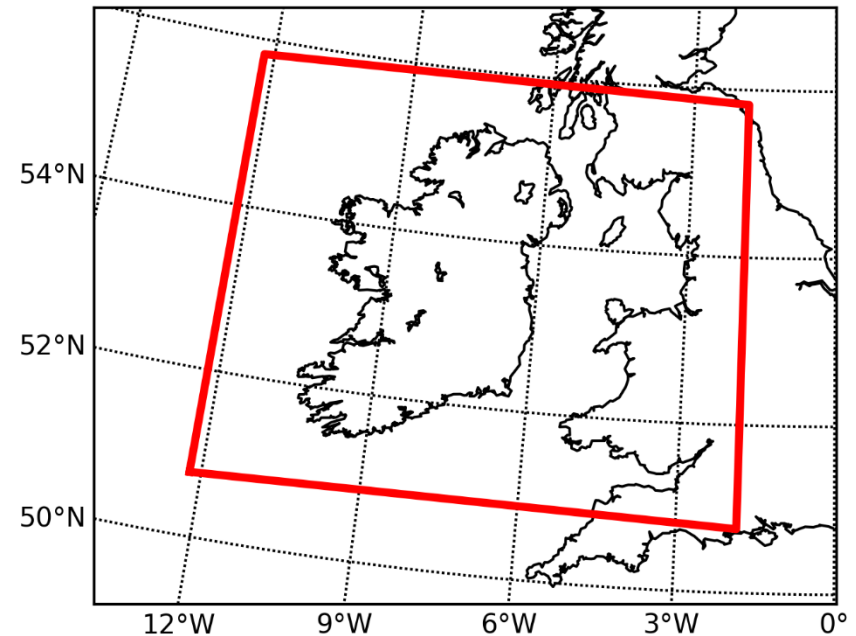


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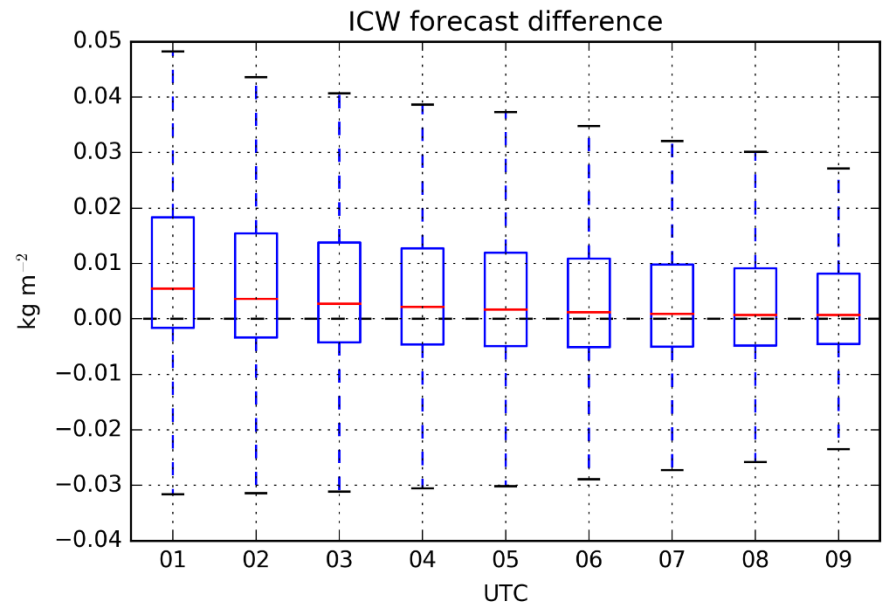
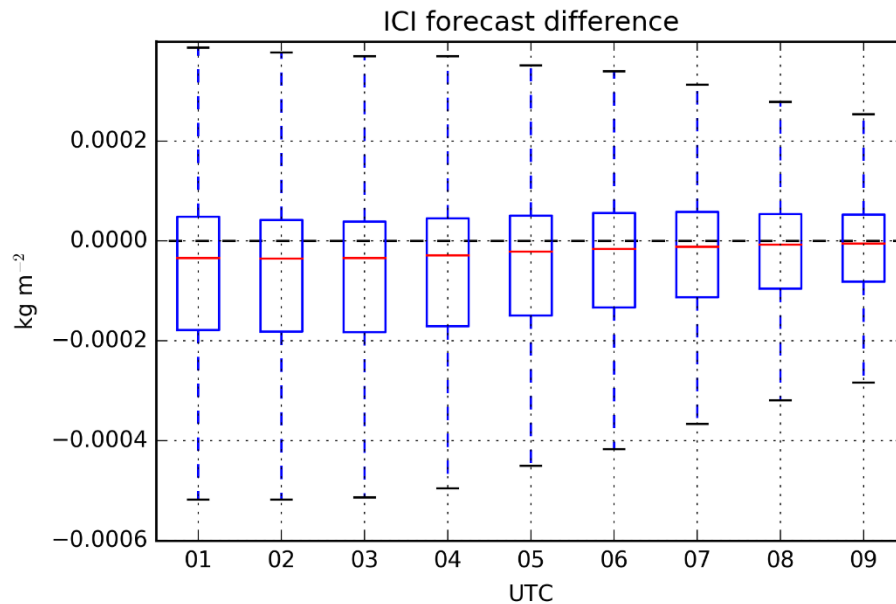
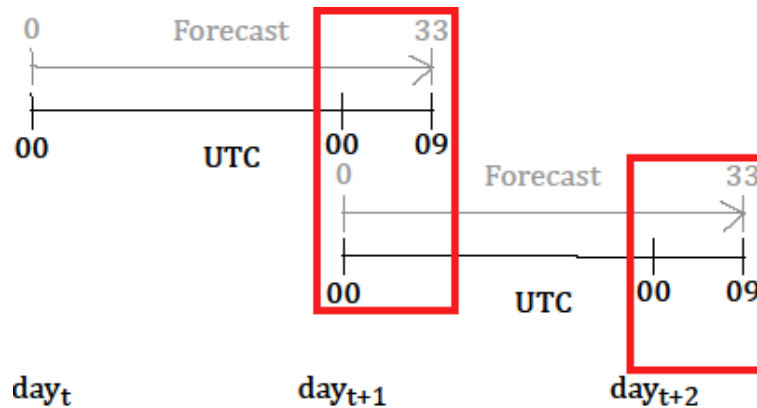


Condensed Water Path (CWP)

- Satellite: CWP
 - 3km, 15 min, daylight
- MÉRA: ICI + ICW
 - 2.5km, hourly
- Common Validation Area



MÉRA Spin-up



- Vertically Integrated Cloud Water (ICW)
- Vertically Integrated Cloud Ice (ICI)

Data selection

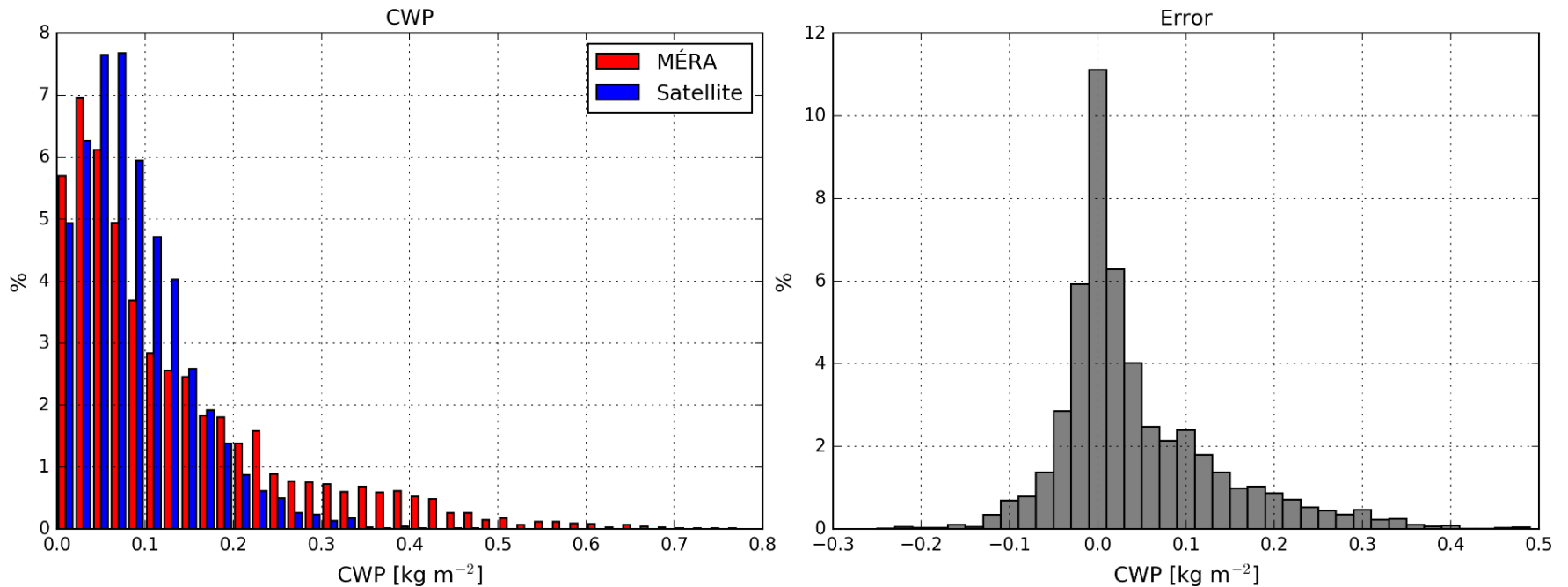
Full area, non-NaN

3,840 hours

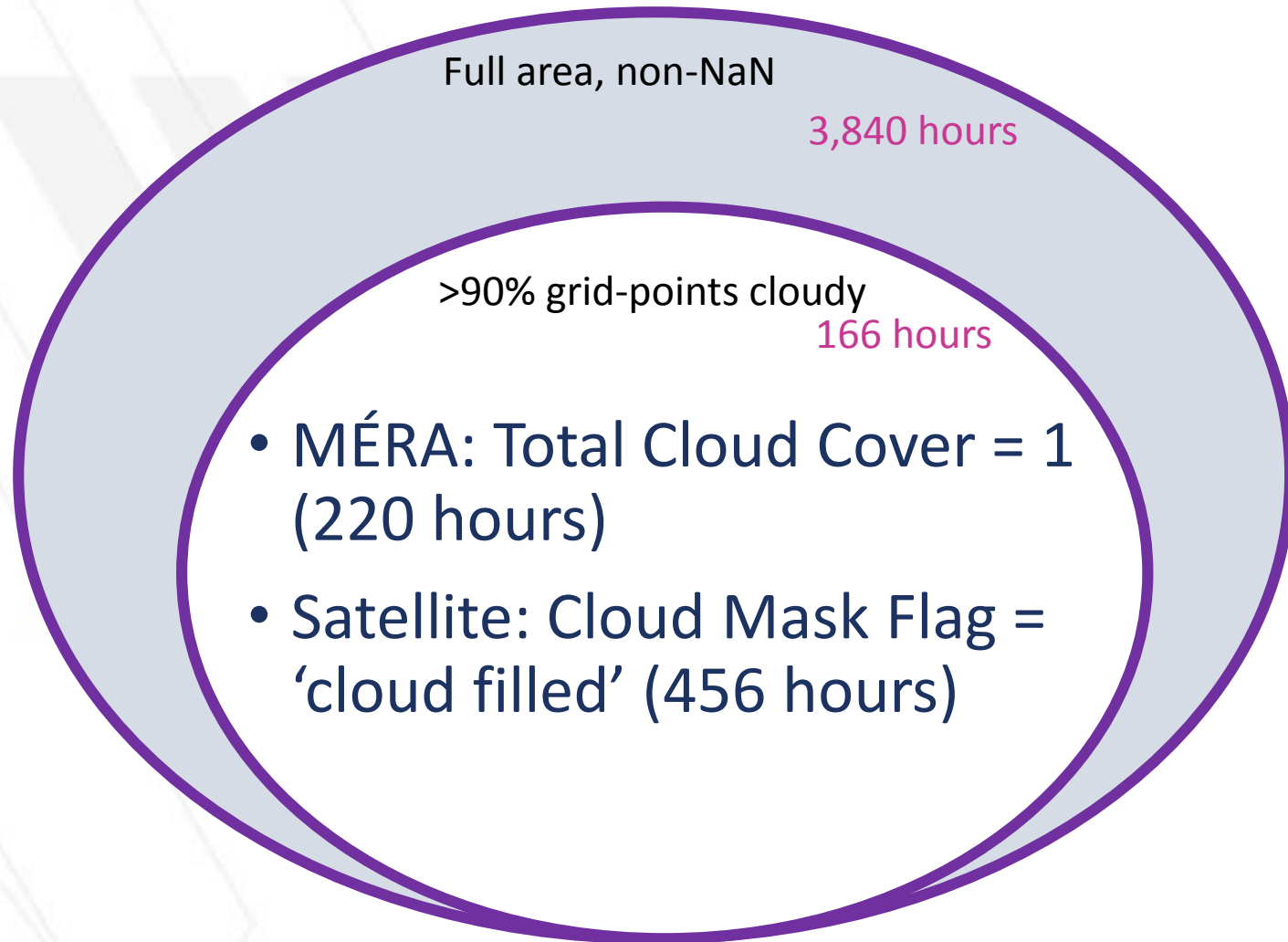
- January 2016 - May 2017
- Daylight hours only
- Elevation above horizon
- Excludes values: 1 December – 12 January

Evaluation of Cloud Water Path (CWP)

- Spatial average
- Error = MÉRA - Satellite

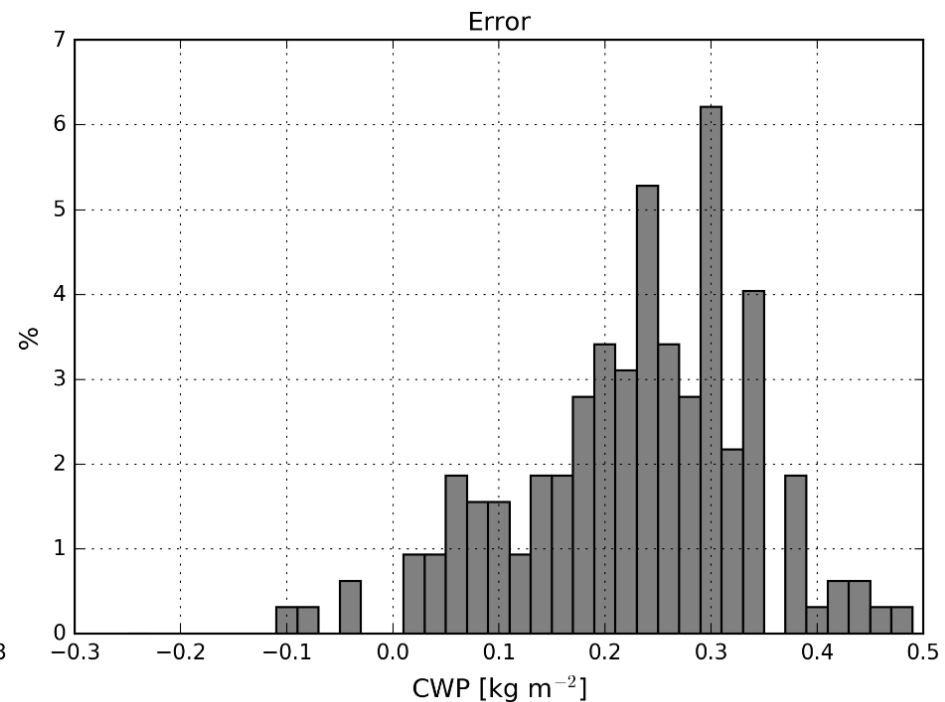
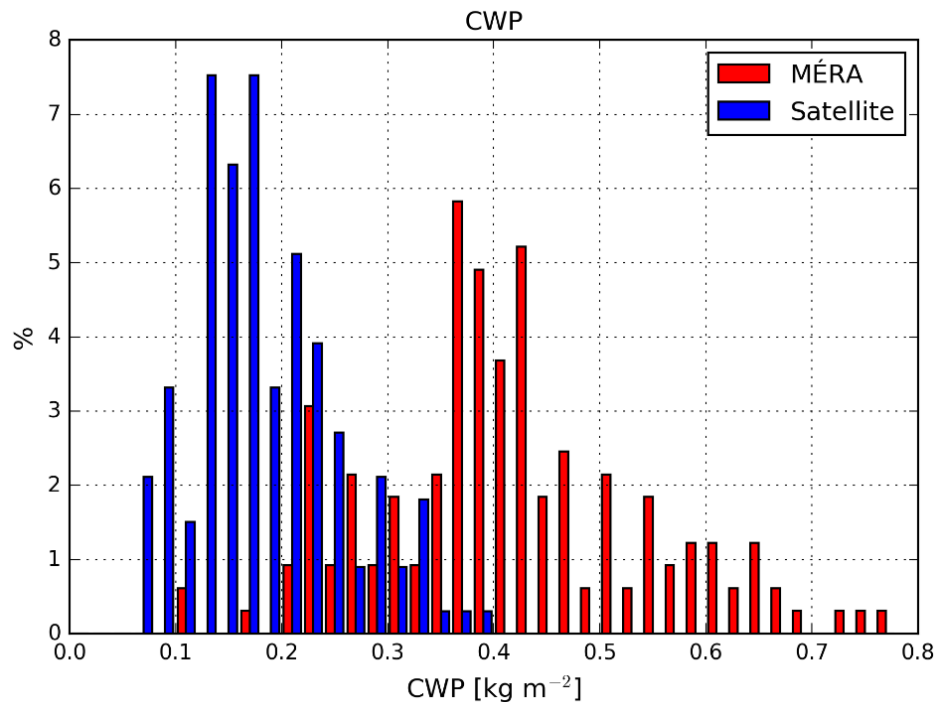


Cloudy hours

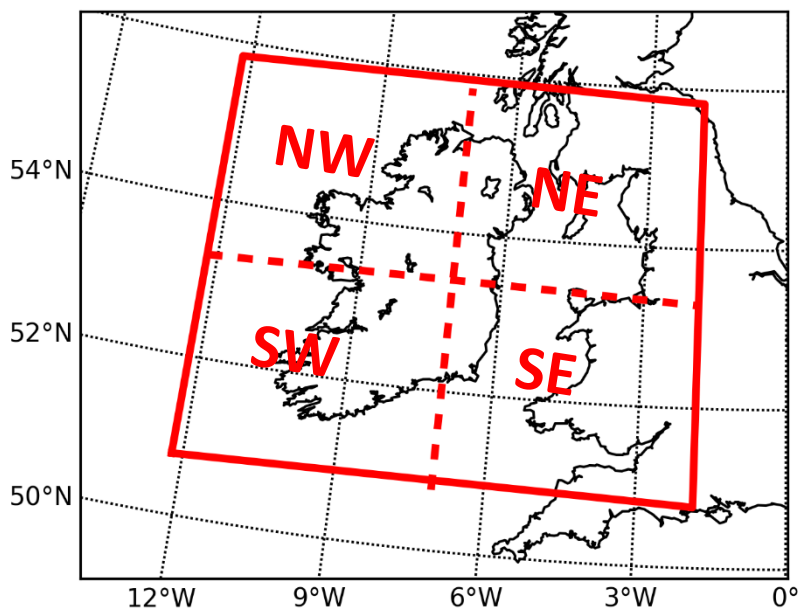


Evaluation of Cloud Water Path (CWP)

- MÉRA overestimates CWP for cloudy hours



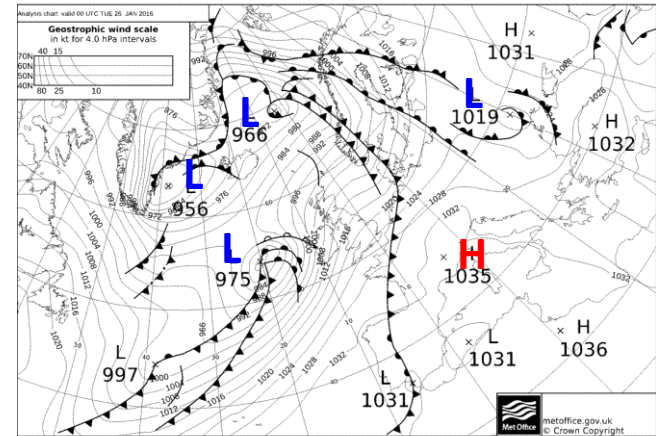
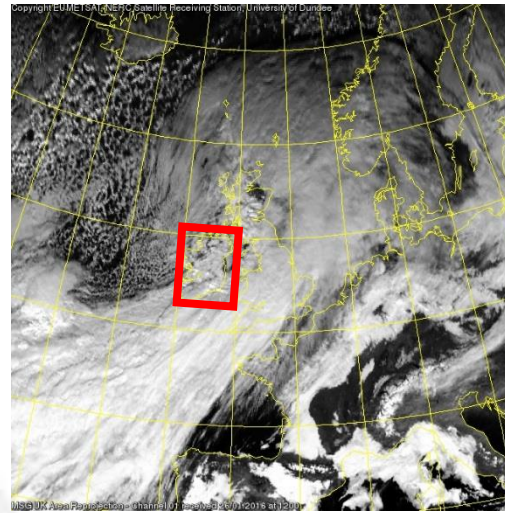
Cloudy Quadrants



	Mean Error [kg m ⁻²]	RMSE [kg m ⁻²]
SW	0.244	0.292
SE	0.194	0.262
NW	0.312	0.390
NE	0.204	0.274
Full Domain	0.238	0.266

Case Study

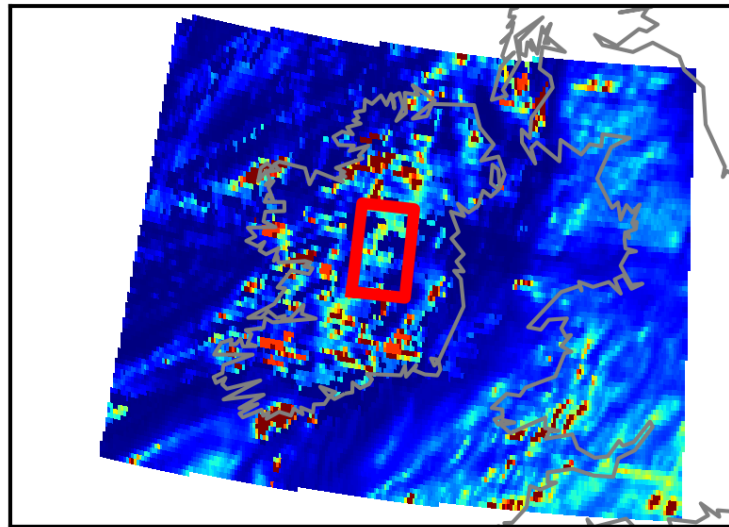
26 January 2016



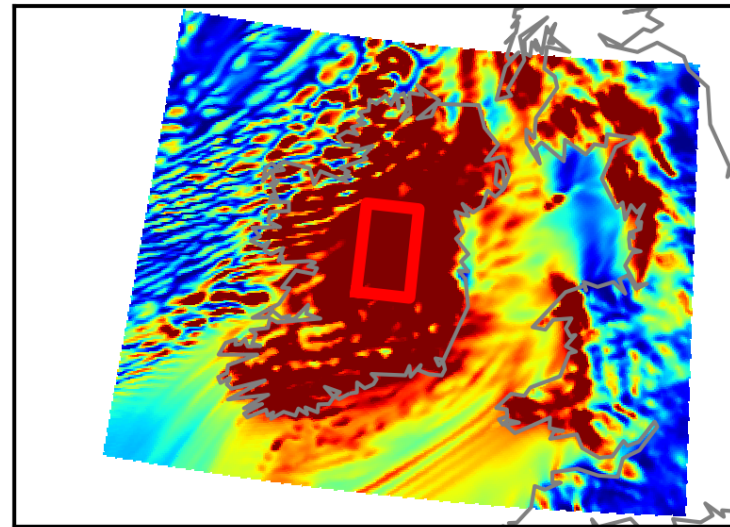
Satellite

MÉRA

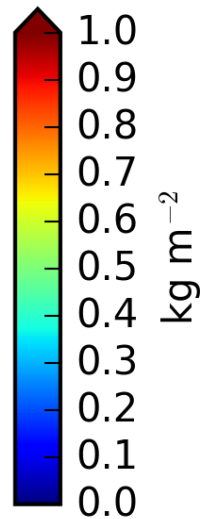
11:00 UTC



0.220 kg m^{-2}

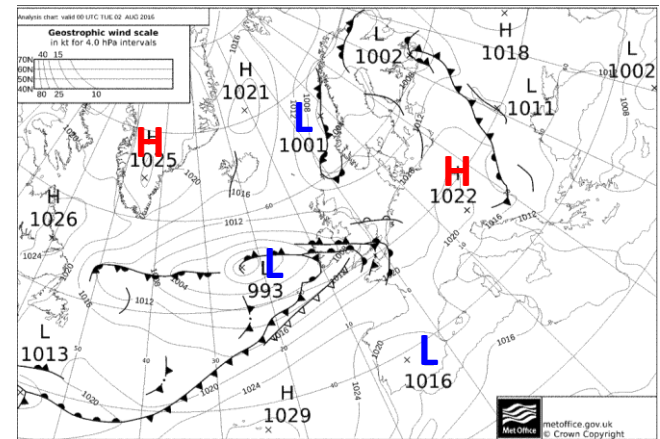
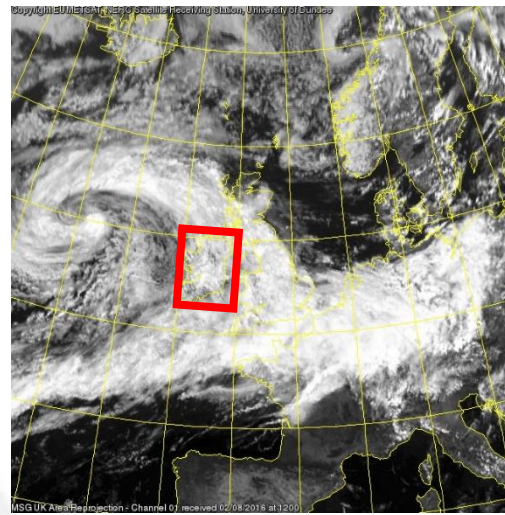


1.418 kg m^{-2}



Case Study

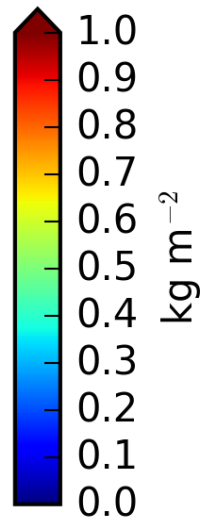
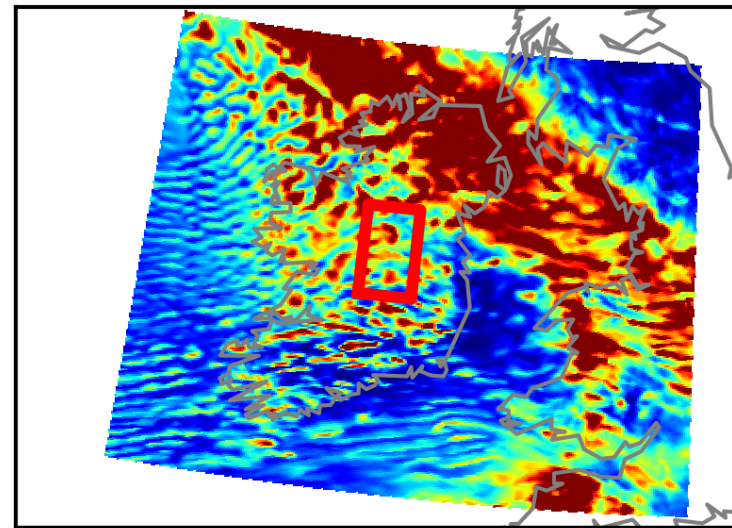
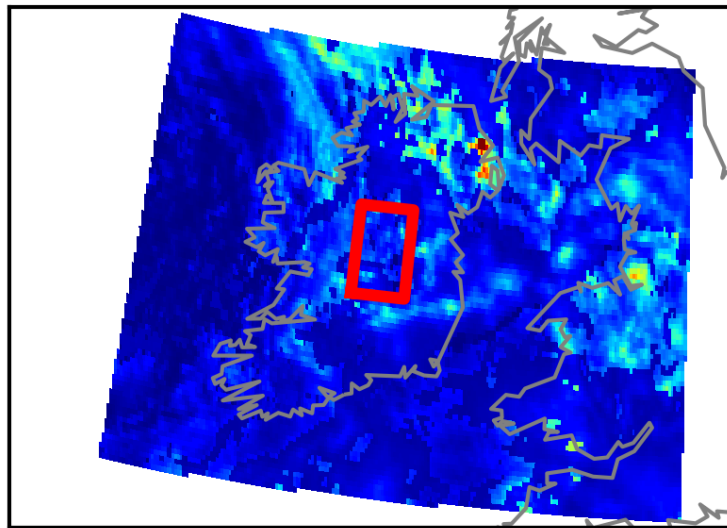
02 August 2016



Satellite

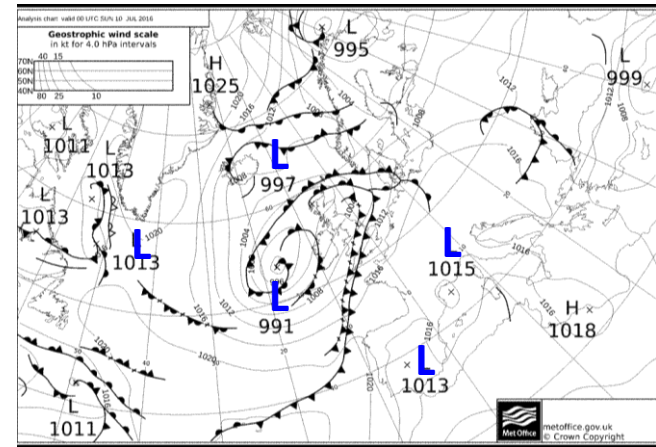
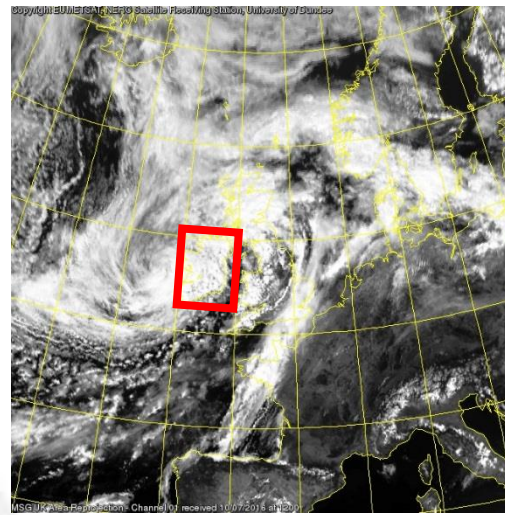
MÉRA

11:00 UTC



Case Study

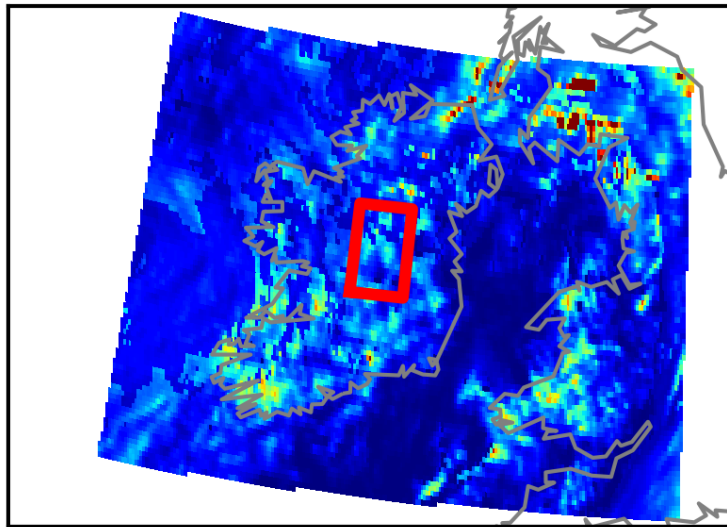
10 July 2016



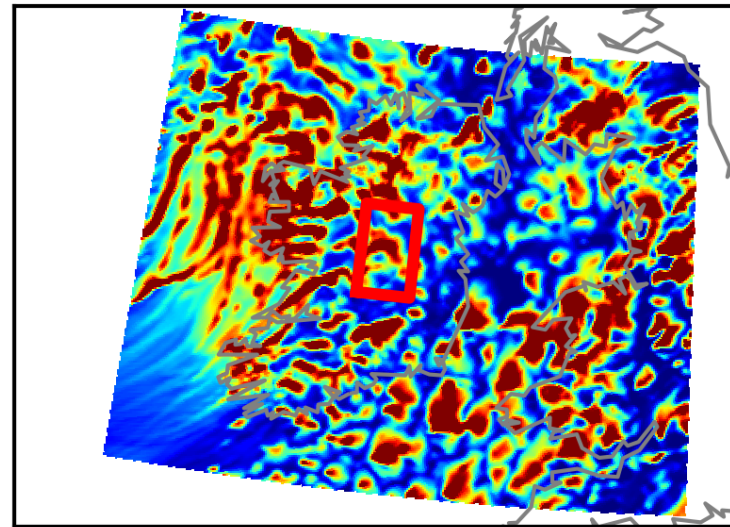
Satellite

MÉRA

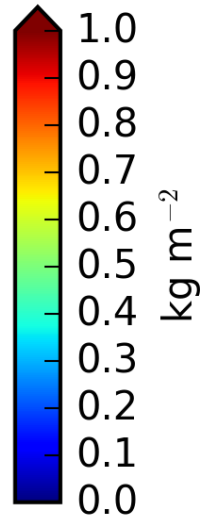
10:00 UTC



0.203 kg m^{-2}



0.527 kg m^{-2}



Conclusions

- Use 09-33H spin-up for MÉRA Condensed Water Path.
- MÉRA in good general agreement with satellite.
- MÉRA overestimates cloudy Condensed Water Path.

Future Work:

- Errors related to cloud type/level?
- Errors related to weather patterns?

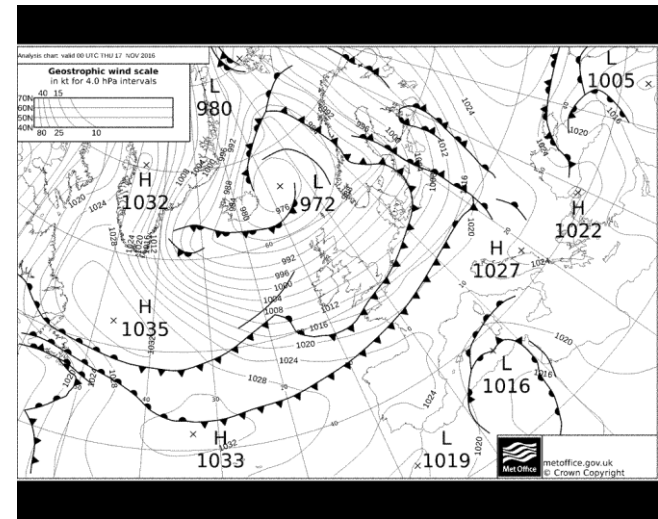
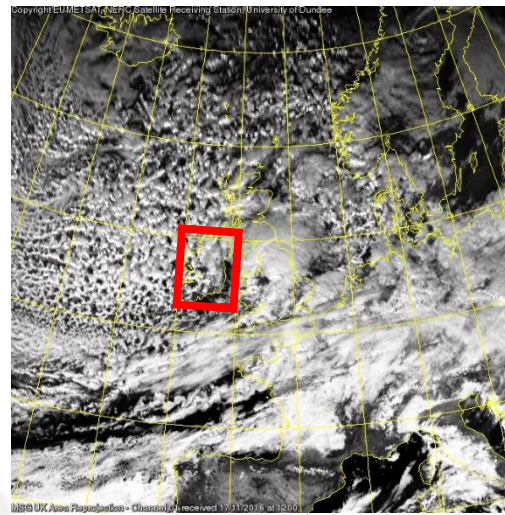
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Case Study

17 November
2016



Satellite

MÉRA

12:00 UTC

