SPECIAL PROJECT PROGRESS REPORT

All the following mandatory information needs to be provided. The length should *reflect the complexity and duration* of the project.

Reporting year	2019
Project Title:	Upscale impact of diabatic processes from convective to near-hemispheric scale
Computer Project Account:	spdecrai
Principal Investigator(s):	George Craig
Affiliation:	Meteorologisches Institut Ludwig-Maximilians-Universität München Theresienstr. 37 80333 München Germany
Name of ECMWF scientist(s) collaborating to the project (if applicable)	None
Start date of the project:	2019
Expected end date:	2021

Computer resources allocated/used for the current year and the previous one

(if applicable)

Please answer for all project resources

		Previous year		Current year	
		Allocated	Used	Allocated	Used
High Performance Computing Facility	(units)			5M	3.4M
Data storage capacity	(Gbytes)			0	0

Summary of project objectives (10 lines max)

The main goal of this project is to further explore the role of convection and the associated latent heat release for upscale growth of errors in numerical weather prediction. Past studies (e.g. Rodwell et al., 2013) suggested a degrading influence of convection over the North American continent on forecast quality over Europe. This hypothesis will be further explored using the ICON global model together with perturbations of latent heat over North America.

Summary of problems encountered (10 lines max)

No problems encountered.

Summary of plans for the continuation of the project (10 lines max)

We plan to simulate European bust cases identified by the era-interim forecasts as in Rodwell et al, 2013. The simulations will be similar to the year of simulations described below and involve latent heat perturbations over the North American continent.

List of publications/reports from the project with complete references

None yet.

Summary of results

The ICON model has been used to simulate one year (2016) of 15 day forecasts, starting from 0 UT at every day of the year. In addition to an unperturbed run, latent heat perturbations over the North American continent have been applied early on in the forecast (the first 48h of simulation time). One run with 75% of the normal latent heat and one run with 125% of the normal latent heat has been computed. Thus there is for each day in 2016 a small, three member ICON ensemble that accounts for potential uncertainties in the latent heating over North America.

The simulations have been done very recently. Thus only very first preliminary results are available. To measure the impact of the latent heat perturbation on the forecast over Europe we computed the standard deviation of Z500 of the ICON ensemble over Europe and devided it by the standard deviation of the ECMWF ensemble forecasts. Averaged over the year, the ratio reaches about 30% at day 6 and about 40% at day 8. As expected, the impact is much larger in summer than in winter, giving 50% versus 30% at day 8. These first results suggest a quite significant impact of the modest latent heat perturbations over North America to the forecast over Europe.