The CFMIP Diagnostic Codes Catalogue (Tsushima et al., 2017, GMDD)

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What is the CFMIP Diagnostics Codes Catalogue?

- The CFMIP Diagnostics Codes Catalogue collects cloud metrics, diagnostics and methodologies and also provides programs to calculate them.
- Diagnostics codes are available in GitHub repositories. The repositories are maintained and managed by the author of the associated diagnostic code.
- You can find a link to each repository on the CFMIP webpage :https://www.earthsystemcog.org/projects/cfmip/.
- The metrics/diagnostics collected here are published in peer-reviewed papers which demonstrate the usefulness of the diagnostics in multi-model (or multi-version) studies.
- The catalogue was initiated by the European Union Cloud Intercomparison, Process Study & Evaluation Project (EUCLIPSE).

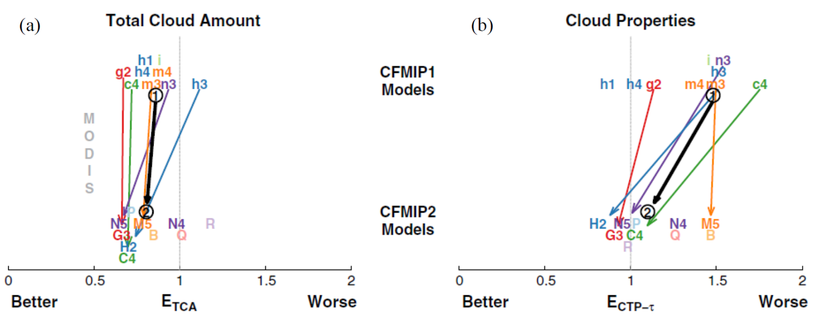
Why have we created repositories and the catalogue?

- Cloud feedback remains the largest source of uncertainty associated with estimates of climate sensitivity using current global climate models.
- A range of methodologies, metrics and diagnostics have been developed, which helps us to understand errors and uncertainties in models.
- In order for this understanding to eventually be reflected in better estimates of cloud feedbacks and climate sensitivity, it is vital to continue to develop such tools and to exploit them fully during the model development process.
- The catalogue facilitates the use of the diagnostics by the wider community studying climate and climate change, and allows diagnostics and metrics to be tested in wide range of models and cases.

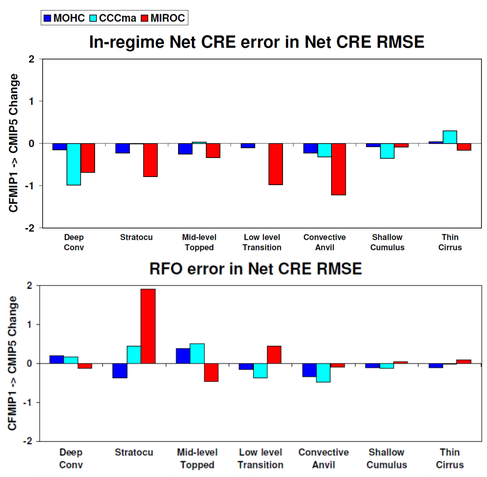
You can find details in Tsushima et al.,2017, GMDD , or contact Yoko Tsushima yoko.tsushima@metoffice.gov.uk

Currently available diagnostics

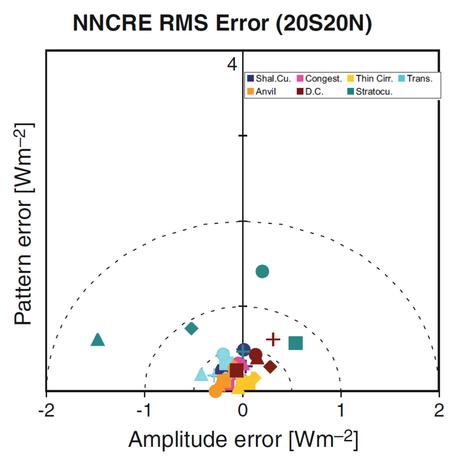
Diagnostics related to all types of clouds



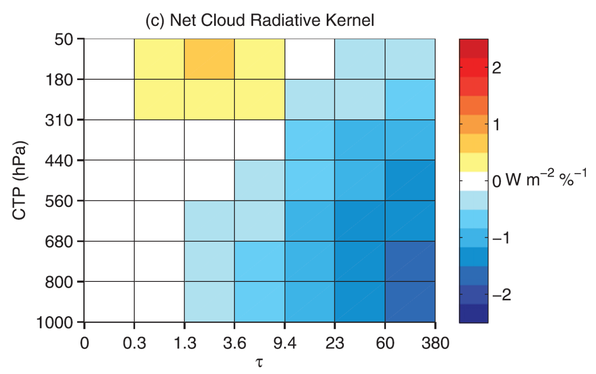
Klein et al., 2013



Williams and Webb, 2009, Tsushima et al. 2013

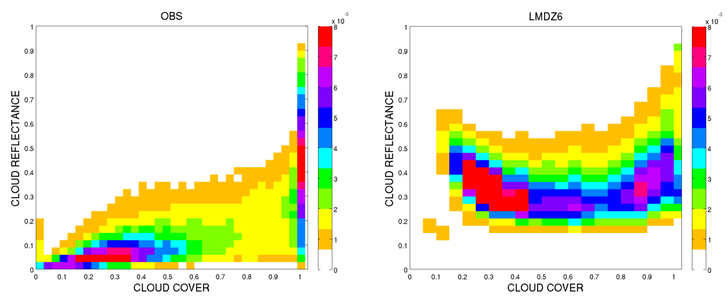


Tsushima et al., 2013

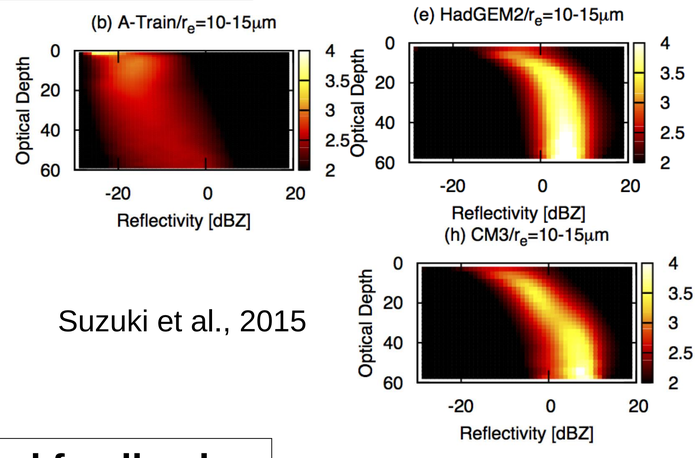


Zelinka et al., 2012

Instantaneous diagnostics for process understanding

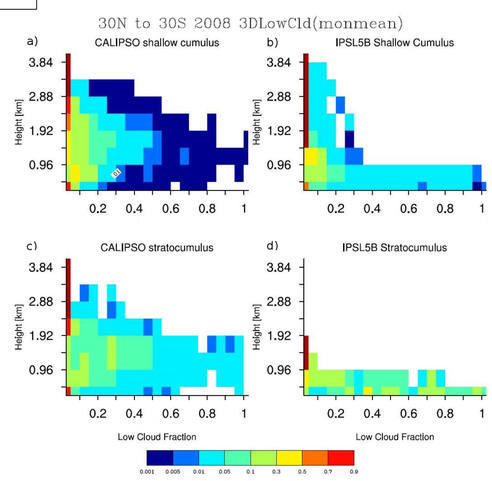


Konsta et al., 2015



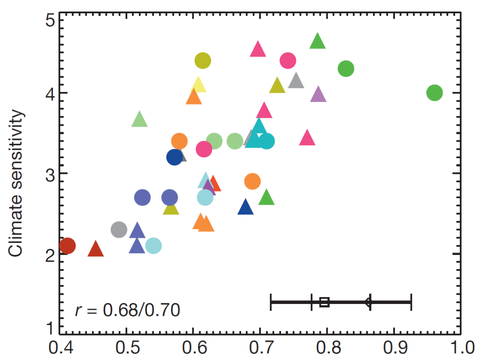
Suzuki et al., 2015

Diagnostics focused on low clouds

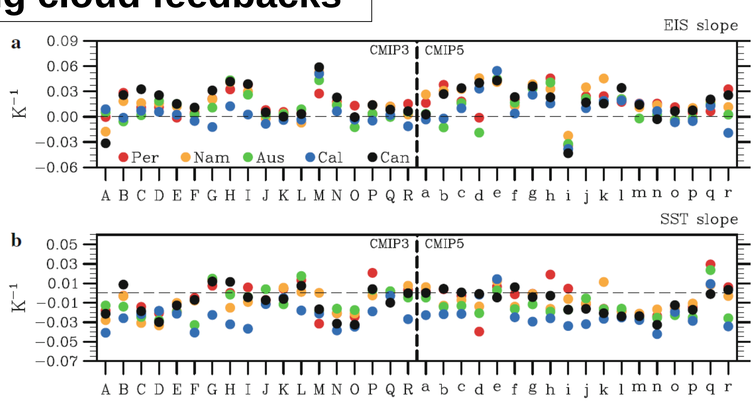


Nam et al., 2012

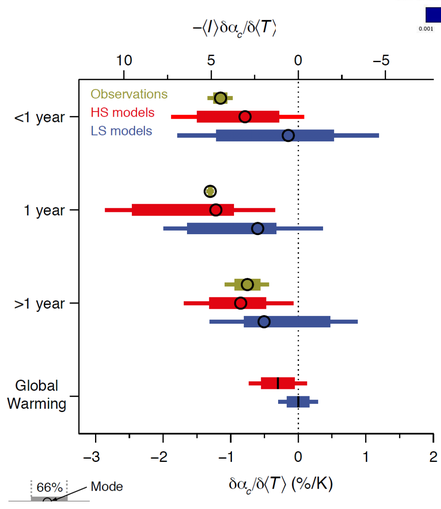
Diagnostics targeted at understanding cloud feedbacks



Sherwood et al., 2014



Qu et al., 2014



Brient and Schneider, 2016

Challenges

- Different authors use different programming languages and the codes which are currently in the repository are provided in their original languages.

Programming Language	Python	NCL	Matlab	IDL	Fortran
Number of code authors	2	2	2	2	1

We very much welcome additional contributions!

Contributions and ideas to improve the repositories are welcome, e.g.

- Code for an existing diagnostic in a different programming language
- Code which implements new diagnostics relevant to analysing clouds – including cloud-circulation interactions and the contribution of clouds to estimates of climate sensitivity in models

Reference:

Tsushima, Y., Brient, F., Klein, S. A., Konsta, D., Nam, C., Qu, X., Williams, K. D., Sherwood, S. C., Suzuki, K., and Zelinka, M. D.: The Cloud Feedback Model Intercomparison Project (CFMIP) Diagnostic Codes Catalogue – metrics, diagnostics and methodologies to evaluate, understand and improve the representation of clouds and cloud feedbacks in climate models, Geosci. Model Dev. Discuss., doi:10.5194/gmd-2017-69, in review, 2017.

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