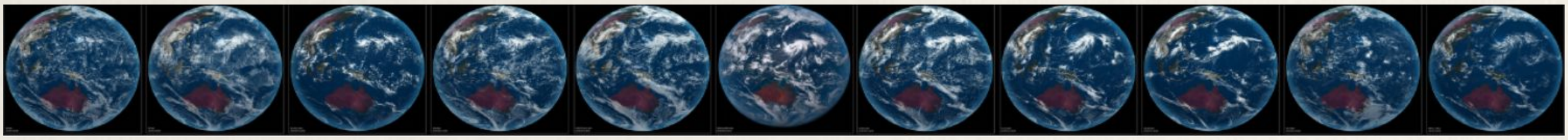
THE DYAMOND INITIATIVE

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THE INITIATIVE

DYAMOND (**DY**namics of the **A**tmospheric general circulation **M**odeled **O**n **N**on-hydrostatic **D**omains) is the first initiative for a model intercomparison of global storm resolving (km-scale) climate simulations. Through their explicit resolution of the major modes of atmospheric heat transport, they endeavor to represent the most important scales of the full three-dimensional fluid dynamics of the atmospheric circulation.

Two main questions:

1) Where do the storm-resolving simulations agree and provide deeper insights into the climate system?
2) How sensitive are the simulations to a particular implementation?
3) What are performance and analysis bottlenecks associated with global storm-resolving models?

Set-up:

- Global, storm-resolving simulations
- All run for the same analysis period
- Encompass experimental field studies
- Two phases covering boreal summer and winter period
- Agile organisation without strict data requirements
- The data is provided at a central point of data access

Coordination: by the Max-Planck-Institute for Meteorology (MPI-M) https://mpimet.mpg.de and The Centre of Excellence in Simulation of Weather and Climate in Europe (ESiWACE) https://www.esiwace.eu

THE SUMMER DATA COLLECTION

Analysis Period: 1 Aug 2016 – 10 Sep 2016

Field Experiment: NAR-VAL2 tropical field study

Experiment: atmosphere only, see the experiment protocol

Completion of the simulations had been done until May 2018.

Model	ARPEGE-NH	FV3	GEOS	ICON	IFS	MPAS	NICAM	SAM	UM
Grid type	Kurihara	Cube	Cube	Icoso	Octo	Voronoi	Icoso	La-Lo	La-Lo
Resolution	2.5km	3.3km	3.3km	2.5km	4.8km	3.8km	3.5km	4.3km	7.8km

Further Information:
Experiment protocol, detailed model description as well as contact persons can be found at https://www.esiwace.eu/services/dyamond/summer

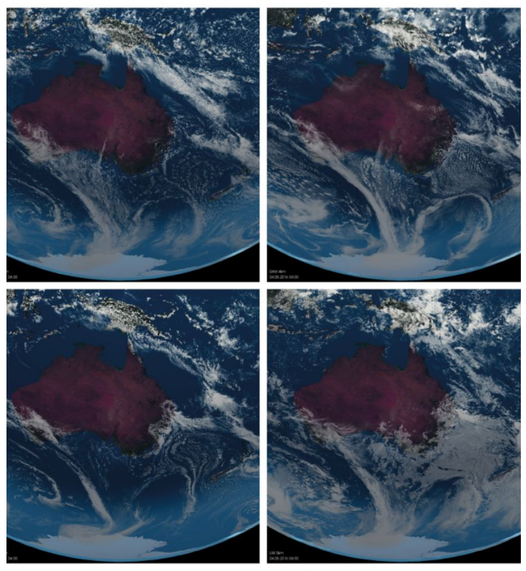


Fig.1: Snapshot of the models highlighting the structure of post-frontal low cloud fields south and east of Australia. [Stevens,PEPS,2019]

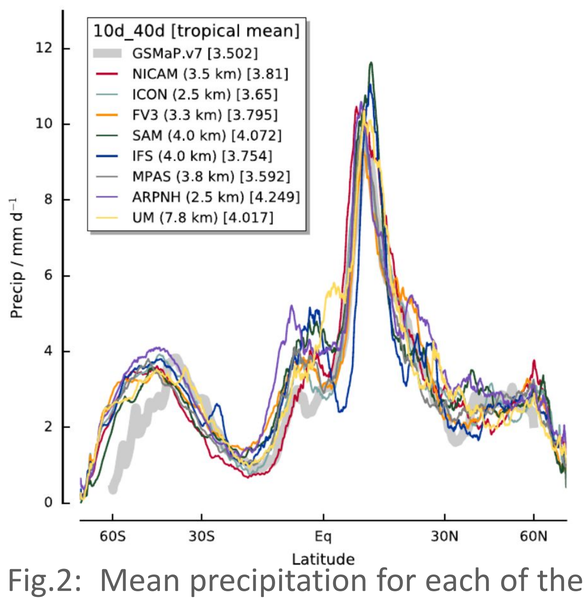


Fig.2: Mean precipitation for each of the indicated models. Mean precipitation from the GSMaP project is provided as a reference. [Stevens,PEPS,2019]

Publications:

- B. Stevens, M. Satoh et al. *Prog Earth Planet Sci* 6, 61 (2019). https://doi.org/10.1186/s40645-019-0304-z.
- Further studies are published in the Special Edition on the DYAMOND initiative, *Journal of the Meteorological Society of Japan*

THE WINTER DATA COLLECTION

Analysis Period: 20 Jan 2020 – 1 March 2020

Field Experiment: EUREC4A tropical field study

Experiment: atmosphere only (atm) and coupled atmosphere-ocean (coup) if possible, see the experiment protocol

At the moment, completion of the simulations is ongoing and the DYAMOND coordination team is checking the data for consistency. Up to now following data sets have arrived:

Model	ARPEGE-NH	SHiELD	GEOS	ICON	IFS-NEMO	NICAM	SCREAM	SAM	MPAS	UM
Grid	Kurihara	Cube	Cube	Icoso	Octo	Icoso	Cube	La-Lo	Varonoi	La-Lo
Resolution	2.5km	3km	6km 3km 1.5km	5km 2.5km	9km 4km	3.5km	3km	4km	3.75km	4.8km
Experiment	atm	atm	atm coup	atm coup	coup	atm	atm	atm	atm	atm

Additional 3 models have announced their contributions.

Further Information: at https://www.esiwace.eu/services/dyamond/winter

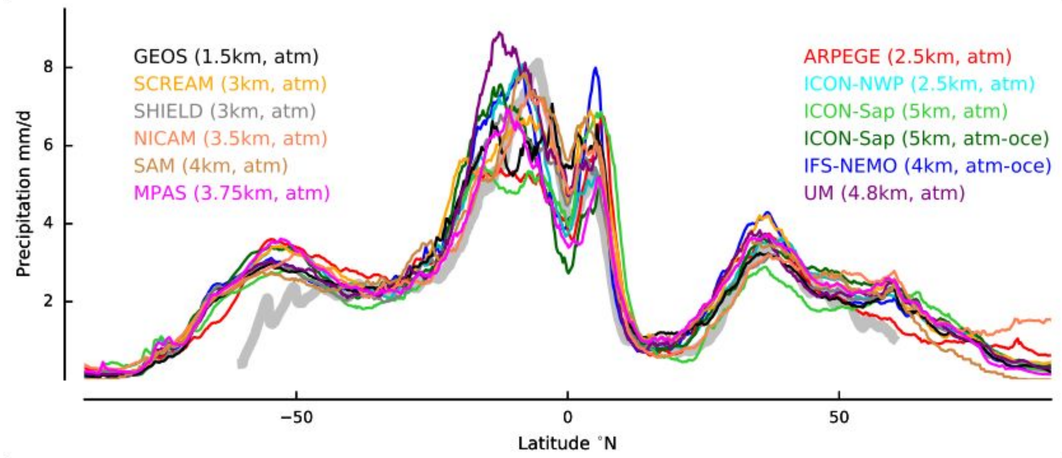


Fig.3: First snapshot of mean precipitation for each of the indicated models. Mean precipitation from the EUREC4A field study provided as a reference.

HOW TO ACCESS

Both DYAMOND data collections are stored on the tape archive of the Deutsches Klimarechenzentrum GmbH (DKRZ). They can be accessed via the DYAMOND data library at the DKRZ supercomputer mistral.

Who can access: any scientist interested in analysing

How to get: write an e-mail to dyamond@esiwace.eu

Where to analyse: DKRZ serves you with compute time and disk space

Support for your analysis:

Within the DYAMOND data library you can find

- Data description and meta data files
- Example post-processing scripts

And our webpage https://www.esiwace.eu/services/dyamond provides

- Detailed descriptions of each model and run
- Contacts to model experts

Also try out our freva frontend http://gems.dkrz.de.

In addition, ESiWACE is planning to organise a 3rd DYAMOND Hackathon in 2021. Stay tuned at www.esiwace.eu.

The 3rd PAN-GASS Meeting has organized an analysis competition to encourage the use of DYAMOND data https://www.gewexevents.org/..

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