Report on project bb1153

Project: **1153**
Project title: **DYAMOND**
Principal investigator: **Daniel Klocke**
Report period: **2022-11-01 to 2023-10-31**

The DYAMOND project was requested as a dedicated project with modest compute resources for the server-side post-processing of data, especially output of the European project nextGEMS[1] simulations and in support of the international DYAMOND initiative[2]. This practice has proven very valuable for a few years already. It allowed us to give users access to these resources without risking them accidentally burning the substantial resources of other projects and to create a platform to facilitate the exchange between users.

Currently, nearly 377 users of more than 50 institutions worldwide are using the data, 130 users more than at the end of 2022. A significant increase in the usage of DYAMOND resources is observed around and following the nextGEMS Cycle 3 Hackathon (28 May - 3 Jun 2023, Madrid).

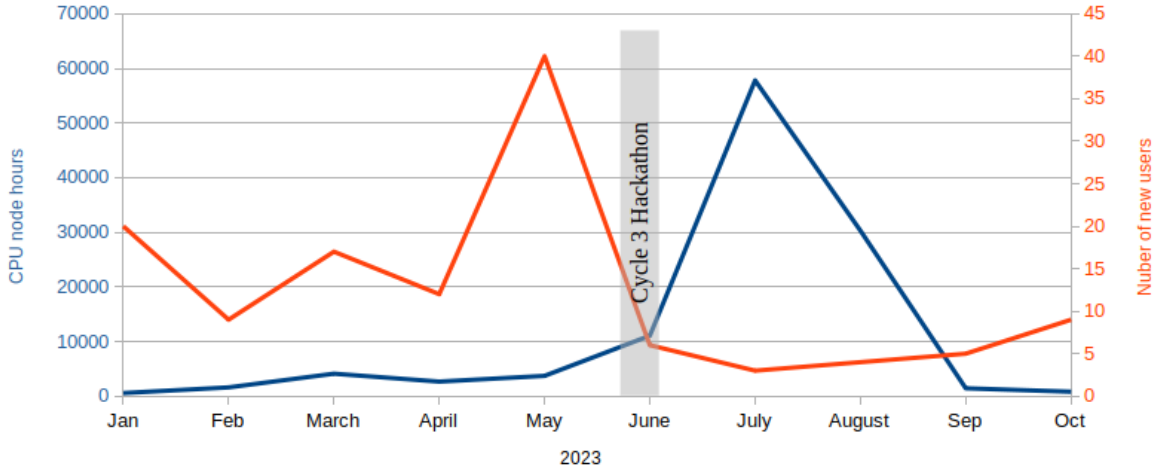

Figure 1: Levante CPU node usage by the DYAMOND project (bb1153) users and number of new users in the project in 2023.

Although the nextGEMS project started 2 years ago, each new simulation cycle attracts new users to analyse these storm-resolving simulations. The DYAMOND intercomparison data sets are also attractive to scientists from all over the world. Although the last period of the initiative (DYAMOND Winter) was started in 2019 and the supporting project ESiWACE2[3] ended in March 2023, there are still 1-2 new users per month requesting data access. The easy access to DYAMOND data especially attracts young scientists from all over the world, so that they learn how to work with global high-resolution data sets and can make efficient use of future pre-exascale simulations. With the DYAMOND simulations (the DYAMOND-Summer and DYAMOND-Winter data sets) and the three development cycles of nextGEMS simulations completed, the user group is expected to still grow in the next year, a trend visible in current usage of the resources.

[1] nextGEMS project: `https://nextgems-h2020.eu`
[2] DYAMOND initiative: `https://www.esiwace.eu/the-project/past-phases/dyamond-initiative`
[3] ESiWACE2 project: `https://www.esiwace.eu/the-project/past-phases/esiwace2-1`

In addition to the numbers above, the usefulness of the DYAMOND project in providing the resources for research is shown in an increased number of publications referencing the data of the nextGEMS simulations, including the DYAMOND simulations, and acknowledging DKRZ in the storage and/or computing support, e.g. Hohenegger et al. (2023), which presents the new ICON-Sapphire model configuration, which employs grid spacing of 10 km and finer to represent the flow of energy and matter within the Earth System.

An (incomplete) list of publications related to the DYAMOND initiative can be found at: `https://www.esiwace.eu/services/dyamond-initiative/dyamond-related-publications`. Publications using the DYAMOND simulations and the nextGEMS three development cycles simulations are also listed at `https://nextgems-h2020.eu/publications/`.

Literature

Hohenegger, C., P. Korn, L. Linardakis, R. Redler, R. Schnur, P. Adamidis, J. Bao, S. Bastin, M. Behravesh, M. Bergemann, J. Biercamp, H. Bockelmann, R. Brokopf, N. Brüggemann, L. Casaroli, F. Chegini, G. Datseris, M. Esch, G. George, M. Giorgetta, O. Gutjahr, H. Haak, M. Hanke, T. Ilyina, T. Jahns, J. Jungclaus, M. Kern, D. Klocke, L. Kluft, T. Kölling, L. Kornblueh, S. Kosukhin, C. Kroll, J. Lee, T. Mauritsen, C. Mehlmann, T. Mieslinger, A. K. Naumann, L. Paccini, A. Peinado, D. S. Praturi, D. Putrasahan, S. Rast, T. Riddick, N. Roeber, H. Schmidt, U. Schulzweida, F. Schütte, H. Segura, R. Shevchenko, V. Singh, M. Specht, C. C. Stephan, J.-S. von Storch, R. Vogel, C. Wengel, M. Winkler, F. Ziemen, J. Marotzke, and B. Stevens (2023). "ICON-Sapphire: simulating the components of the Earth system and their interactions at kilometer and subkilometer scales". In: *Geoscientific Model Development* 16.2, pp. 779–811. DOI: 10.5194/gmd-16-779-2023.