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Modelling of the Hunga Tonga eruption for testing the GPU port of ICON

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Porting weather and climate models such as ICON to GPU-based computer production systems requires serious testing of the code adapted to the additional hardware and its software stack. The high resolution of storm resolving models poses problems for porting ICON and very short simulations facilitate this task.

The 2022 eruption of the Hunga Tonga–Hunga Haʻapai submarine volcano had a very strong water vapour signal, which is modelled by adjusting the model initial conditions to include a cylindrical water vapour plume: a very simple setup to implement, but one that reflects the strong signal in the model results. This plume is visible in the model for years. For the test case we focus on the first time steps. These support the detection of technical errors in the porting of the model code in very short simulations at the final model resolution of 5 km.

We present the scientific use case, the model configuration and some results from test simulations on Lumi.

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