



## **Extreme scaling for global weather forecasts at O(1km) horizontal resolution**

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We report on recent experimentation towards improved scalability of high resolution simulations with the Integrated Forecast System of the European Centre for Medium-Range Weather Forecasts (ECMWF). A significant step towards further savings both in terms of throughput and speed-up is provided by the impact on simulations if numerical precision is selectively reduced in high resolution simulations from double to single precision. However, while higher horizontal resolution evidently increases the cost of simulations, there are other computational cost drivers arising from increasing model complexity through coupling of ocean waves, and including the ocean circulation and its interaction with the atmosphere.

The cost/benefit ratios of these different modelling aspects are evaluated and illustrated with global simulations for the "Medicane" Trixie, a rare, high-impact weather event in the Mediterranean with a tropical-like cyclone structure that was observed in October/November 2016. High resolution simulations with IFS are performed as part of the ESiWACE project ([www.esiwace.eu](http://www.esiwace.eu)).