

1000-member ensemble forecasts for extreme events: the 2019 typhoon Hagibis and the July 2020 Kyushu heavy rain

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Forecast performances of several extreme events have been revisited with the aim of improving the forecasts for these events. Our approach is to better quantify forecast uncertainties by running data assimilation systems with 1000 ensemble members. The two data assimilation methods to be used are the local ensemble transform Kalman filter (LETKF) and the hybrid variational-ensemble method (EnVAR). For LETKF, a large number of ensemble members also enables us to extract more information from observations. To save computational costs, vertical localization is removed. Verifications show that the resulting forecasts outperform the operational forecasts both in deterministic and probabilistic forecasts. We hypothesize that running data assimilation schemes with around 1000 ensemble members is more effective if vertical localization is removed at the same time.

Keywords: data assimilation, 1000 ensemble members, vertical localization