



## **Horizontal resolution impact on forecast error growth**

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The impact of horizontal resolution increases from spectral truncation T95 to T799 on the error growth of ECMWF forecasts is analysed. Attention is focused on instantaneous, synoptic-scale features represented by the 500 and 1000 hPa geopotential height and the 850 hPa temperature. Error growth is investigated by applying a three-parameter model, and improvements in forecast skill are assessed by computing the time limits when fractions of the forecast error asymptotic value are reached. Forecasts are assessed both in a realistic framework against T799 analyses, and in a perfect-model framework against T799 forecasts. A strong sensitivity to model resolution of the skill of instantaneous forecasts has been found in the short forecast range (say up to about forecast day 3), but the sensitivity becomes weaker in the medium-range (say around forecast day 7) and undetectable in the long forecast range. Although past resolution increases have been providing continuously better forecasts especially in the short forecast range, these results suggest that in the future, although further increases in resolution are expected to improve the forecast skill in the short and medium forecast range, simple resolution increases without model improvements would bring only very limited improvements in the long forecast range.