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Don′t think upscaling is going to save you

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When datasets display low quality at its highest resolution –either observations, quasi-observations or simulations—we often recur to upscaling in space and/or time to smooth out small-scale imperfections. We do this believing that a coarser resolution is the price to pay for obtaining a more meaningful dataset. Upscaling has shown its virtues particularly at the time of reducing random noise and improving scores such as root mean squared differences.

The question that concerns this presentation is whether synchronicity –here understood as time correlation– is improved by upscaling. For example, when nested regional climate models (RCMs) are driven by reanalysis we may expect them to add value upon the driving dataset thanks to a higher resolution. It is well known that the synchronicity between the downscaled field and observations may be degraded with respect to that of the reanalysis, and that this degradation may depend on the presence of large-scale nudging. For those cases where synchronicity is important –such as when we are aiming to create poor′s man high-resolution reanalysis–, a question that remains open is whether aggregating in time increases the correlation between RCM output and observations. That is, although the RCM may be unable to reproduce a given event at the exact time, whether it will still be able to satisfactorily simulate an anomaly on a daily, monthly or annual basis.

We will show results from some analytical cases and examples using observations and reanalysis-driven RCM-simulated data to illustrate the potential of time upscaling to improve synchronicity. Conclusions, open questions and recommendations regarding this issue will be discussed.