Viewing through the clouds in satellite images

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Let us imagine that you want to know the temperature of the sea before taking the plane for your next holidays. If you are lucky, you can ask a colleague taking part of a campaign in that region to measure the temperature for you. Otherwise, you have to rely on numerical models, and if you don't trust them, you can use the informations provided by the more than 3000 satellites orbiting around the Earth.

Satellites will provide you with the temperature at the surface of the sea (SST), but usually they cannot view through the clouds, hence leaving gaps in the images.

In order to fill these gaps, we use a method based on the decomposition into principal modes: with a time series of images, we are able to determine the main spatial and temporal modes of variations, called the EOF's (*empirical orthogonal functions*). This method is implemented in the software DINEOF (Beckers and Rixen, 2003; Alvera-Azcárate *et al.*, 2005).

Using this information, it is then possible to reconstruct the SST under the clouds... and discover if it's warm enough to go swimming.

References

Beckers J.-M. and M. Rixen. 2003. EOF calculation and data filling from incomplete oceanographic datasets. Journal of Atmospheric and Oceanic Technology 20:1839-1856.

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