Research SSS products with improved resolution

All ocean L4 products distributed by CP34 BEC are obtained by the application of **singularity-based fusion.** We will discuss this technique in greater detail in this blog when the paper presently under revision is available. So far, it suffices to comment that with this technique a template variable (Sea surface temperature, SST, in our case) of good quality is used to restore the multifractal structure of singularity fronts on a noisy variable (SSS in our case). To know more about the multifractal structure of ocean scalars please consult the 2009 Ocean Science paper.

Sequence of binned L3 SSS maps

The animation above represents the sequence of binned L3 SSS maps; each frame is a 10-day average, which a time lag of three days between the beginning of consecutive averaging periods. This map has a resolution of 1 degree X 1 degree, what is a rather coarse time and space resolution when phenomena like Tropical Instability Waves or the onset of a El Nino are sought. To make things worse, present levels of accuracy on SMOS products make even harder to characterize this large scale phenomena. This is a typical situation in which L4 products can come to rescue!

Singularity-based fusion cannot only be used to improve the signal level, but in principle it can also be used to increase the spatial and time resolution of fused maps, provided that the template (SST for us) has the target space and time resolutions. At BEC we have started to explore the advantages of attaining a better spatial resolution by application of singularity-based fusion, passing from the 1-degree resolution of binned SMOS SSS maps to 0.25-degree resolution inherited of

rebinned OSTIA SST maps; time resolution is kept in 10 days.

Sequence of fused SSS maps

The results are visually appealing (see panel below), but, can we improve the quality of the scientific assessment with these products? The answer will be given in a post to follow…

AMT