

Comment on **essd-2021-462**

Anonymous Referee #1

Referee comment on "A new operational Mediterranean diurnal optimally interpolated sea surface temperature product within the Copernicus Marine Service" by Andrea Pisano et al., Earth Syst. Sci. Data Discuss., <https://doi.org/10.5194/essd-2021-462-RC1>, 2022

This study presents a high resolution (1/16-deg and 1-hr) DOISST using SEVIRI satellite as source and a model SST as first-guess, which will no doubt have many applications. Their analysis demonstrated that DOISST well represent the diurnal cycle with a low mean bias and RMSD of 0.4°C. The seasonal features of SST diurnal cycle in MED area are described and compared with independent buoy SST and model simulation. My major concern is how the model SST at 1 m depth is used as the first-guess field. It is not clearly stated what depth the DOISST represent, and how the DOISST is validated with buoy SSTs at 0.2 m depth. The ideal case is that all three components are compared/generated at the same depth level. I recommend accept the manuscript after a major revision.

L14, it is not clear why the model analysis is used as the first-guess.

L15-16, it is not clear what is "any diurnal cycle". "differences between satellite and model SST are free, or nearly free". If this is the case, then why do we need DOISST analysis?

L35, Does this mean, the SST analysis will be absent when it is rain?

L71, "slightly less than that" => approximately?

L155, SST at 1 m level. What depth does the satellite SST in section 2.2 represent? How is the model SST at deeper level used as a first-guess of the satellite SSTs near the skin

level?

L158, how is the buoy SST at 20 cm level used to validate DOISST

L166, delete an extra space.

L169, "between" => among?

Table 1, sub-skin SST, What is the level of sub-skin? please add a depth level.

L188-190, the statement is not clear, and need to be clarify, particularly "allowing to interpolate SST anomalies using satellite data". Is the "anomaly" referenced to an hourly climatology, how is the climatology is defined?

L201-202, what is the difference between L3C SST and L3C sub-skin SST? How are the SSTs at different levels blended in DOISST?

L212, $f(r,dt)=f(r)*(dt)$ may not be appropriate. Delete " $f(r)*(dt)=$ "?

L224, "no first-guess data are used", how is this possible as described in L227-234?

L240, how is "co-located" defined, interpolated to the in situ location and time or rounded to a certain spatial and time resolution?

L272-273, How is the uncertainty of RMSD (\pm number) calculated?

L295, is it possible the biases result from the first-guess of the model SST at different level?

L337, define DWA earlier.

L347-347, will the underestimation of DWA in model affect the performance of DOISST since it is used as the first-guess?

L385-386, it may be better to explain the reasons.

L422, these depth information should be presented much earlier

L429, In MED area or over the global oceans?