



*Supplement of*

## **Generation of super-resolution gap-free ocean colour satellite products using data-interpolating empirical orthogonal functions (DINEOF)**

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## S1. Supplementary material

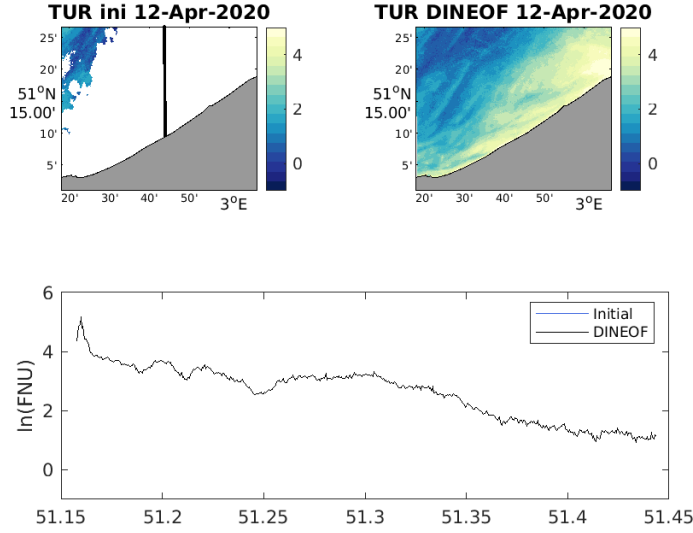


Figure S 1: Top left: initially cloudy data at 60 m resolution, on 12 April 2020 (logarithmic scale). Top right: DINEOF run of the mixed Sentinel-2 and Sentinel-3 dataset, at 60 m resolution (logarithmic scale). Bottom: north-south transect for the two datasets (blue: initial data at 60 m; black: super-resolution DINEOF reconstruction). All plots are in logarithmic scale.

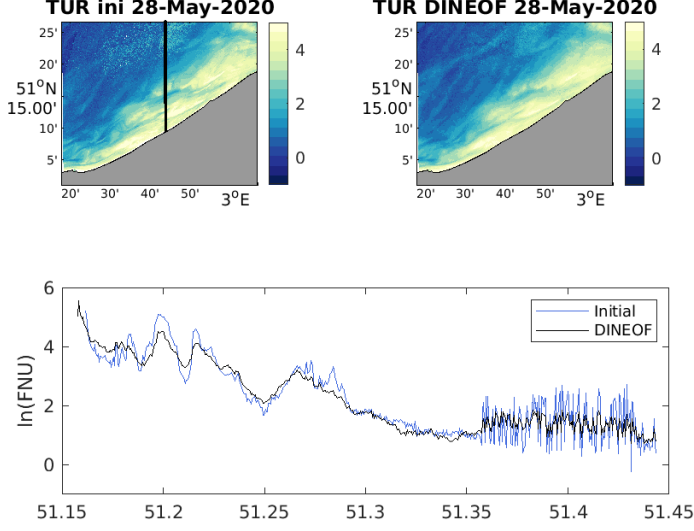


Figure S 2: Top left: initially cloudy data at 60 m resolution, on 28 May 2020 (logarithmic scale), with a noisy region in the northern part of the domain. Top right: DINEOF run of the mixed Sentinel-2 and Sentinel-3 dataset (logarithmic scale), at 60 m resolution. Bottom: north-south transect for the two datasets (blue: initial data at 60 m; black: super-resolution DINEOF reconstruction).

## S2. Metrics used in the validation

Estimated dataset mean:

$$\bar{X}^E = \frac{1}{N} \sum_{i=1}^N X_i^E \quad (\text{S1})$$

Reference dataset mean:

$$\bar{X}^M = \frac{1}{N} \sum_{i=1}^N X_i^M \quad (\text{S2})$$

Type-2 slope:

$$S = \frac{\sum_{i=1}^N (X_a^E)^2 - \sum_{i=1}^N (X_a^M)^2 + \left[ \left( \sum_{i=1}^N (X_a^E)^2 - \sum_{i=1}^N (X_a^M)^2 \right)^2 + 4 \left( \sum_{i=1}^N X_a^E X_a^M \right)^2 \right]^{1/2}}{2 \sum_{i=1}^N X_a^E X_a^M} \quad (\text{S3})$$

with

$$X_a^E = X_i^E - \bar{X}^E \quad (\text{S4})$$

$$X_a^M = X_i^M - \bar{X}^M \quad (\text{S5})$$

and

$$\bar{X}^E = \frac{1}{N} \sum_{i=1}^N X_i^E \quad (\text{S6})$$

the estimated dataset mean, and

$$\bar{X}^M = \frac{1}{N} \sum_{i=1}^N X_i^M \quad (\text{S7})$$

the reference dataset mean.

Type-2 intercept:

$$I = \bar{X}^E - S \bar{X}^M \quad (\text{S8})$$

Determination coefficient:

$$r^2 = \frac{\left[ \sum_{i=1}^N (X_a^E X_a^M) \right]^{1/2}}{\sum_{i=1}^N (X_a^E)^2 \sum_{i=1}^N (X_a^M)^2} \quad (\text{S9})$$

Root Mean Square Difference:

$$\text{RMSD} = \sqrt{\frac{\sum_{i=1}^N (X_i^E - X_i^M)^2}{N}} \quad (\text{S10})$$

Centered Root Mean Square Difference:

$$\text{cRMSD} = \sqrt{\frac{\sum_{i=1}^N (X_a^E - X_a^M)^2}{N}} \quad (\text{S11})$$

Bias:

$$\text{bias} = \frac{1}{N} \sum_{i=1}^N (X_a^E - X_a^M) \quad (\text{S12})$$

Median Absolute Percentage Difference:

$$\text{MAPD} = \text{median} \left( \frac{X_i^E - X_i^M}{X_i^M} \right) \quad (\text{S13})$$