



## SEA BASIN CHECKPOINT LOT4: BLACK SEA

### CHALLENGE 5 – Coasts Expert evaluation of Targeted Products

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Please use your own judgement to describe for each Targeted product of the assessment of the “fitness for purpose and use”. For each Targeted product please comment on the following points:

1. Assign an overall product quality score with respect to scope (fitness for purpose) and explain why, according to the scale in **Table A5.1**.
2. Identify the most important characteristic(s) for the Targeted Product quality (if all characteristics are important, please say so).
3. Identify which quality element(s) the most important characteristic(s) affects the Targeted Product quality.
4. Identify the limitations of the quality of the Targeted products due to the input data set used.
5. Explain which of the characteristics “most fails” to meet the scope of the Targeted Product.
6. Provide an expert judgement of the most important **gaps in the input data sets** for each Targeted Product.

SCORE	MEANING
1	EXCELLENT → completely meets the scope of the Targeted Product
2	VERY GOOD → meets more than 70% of the scope of the Targeted Product
3	GOOD → meets less than 50% of the scope of the Targeted Product
4	SUFFICIENT → does not adequately meet the scope but is a starting point
5	INADEQUATE → does not fulfill the scope and is not usable

**Table 1. Targeted Products quality scores and their meaning.**

## Expert evaluation of Target Product quality

### BLACKSEA\_CH5\_Product\_01

- 1) The purpose of this product is to show variations in the Black Sea level for the past 10 years as detected from altimetry. Overall, the product quality score is **excellent (1)**. The Sea Level trend for the last 10 year is calculated by using CMEMS L4 gridded maps of Sea Level Anomaly from all three TOPEX/Poseidon, Jason-1 and Jason-2 missions.
- 2) The sea level (ASLVMNDY) is the most important characteristic for the product quality.
- 3) The quality elements that affect the quality of this product are the spatial and time resolution and the completeness of the used dataset.
- 4) The limitations on the quality of Targeted products due to the input data set used are:

- horizontal resolution
- large errors in the estimates of sea-level trends

Statistical errors are large relative to the trend itself; for instance, the mean 10 years trend is  $0.002 \pm 0.013$  mm/y (error corresponding to 97.5% confidence).

- 5) The characteristic ASLVMNDY used to generate this product does not fail to meet the scope of the Targeted Product. Altimeter datasets are checked before dissemination thanks to

Cal/Val activities, thus they are considered reliable for 10-year sea-level monitoring. In this product altimeter datasets are used to compute 10-years sea-level trend for the Black Sea.

- 6) The most important gaps in the input dataset is the unavailability of altimeter data and the horizontal resolution.

### BLACKSEA\_CH5\_Product\_02

- 1) The purpose of this product is to show regional variations in the sea level for the past 10 years from satellite altimetry for a number of sub-regions of the Black Sea. Overall, the product quality score is **good (3)**. Eleven sub-regions are identified in order to cover a range of hydrodynamic conditions in the Black Sea: shallow shelf areas, dynamically inactive central deep-water areas, dynamically active (including meandering, jets and eddies formation processes) zone associated with the intensive circular current (Rim Current) and attached to the continental slope and persistent Batumi and Sevastopol anticyclonic gyres. Sea Level trends for the last 10 year for the 11 sub-regions are calculated by using CMEMS L4 gridded maps of Sea Level Anomaly from all three TOPEX/Poseidon, Jason-1 and Jason-2 missions.
- 2) The sea level (ASLVMNDY) is the most important characteristic for the product quality.
- 3) The quality elements that affect the quality of this product are the spatial and time resolution and the completeness of the used dataset.
- 4) The limitations on the quality of Targeted products due to the input data set used are:
  - horizontal resolution
  - large errors in the estimates of sea-level trends

Statistical errors are very large relative to the trend itself; for example, the 10 years trend for sub-region 1 is  $9.7 \pm 21.7$  mm/y and the 10 years trend for sub-region 5 is  $8.7 \pm 19.6$  mm/y (error corresponding to 97.5% confidence).

- 5) The characteristic ASLVMNDY used to generate this product does not fail to meet the scope of the Targeted Product. Altimeter datasets are checked before dissemination thanks to Cal/Val activities, thus they are considered reliable for 10-year sea-level monitoring. In this product altimeter datasets are used to compute 10-years sea-level trend for the Black Sea.
- 6) The most important gaps in the input dataset is the unavailability of altimeter data and the horizontal resolution.

### BLACKSEA\_CH5\_Product\_03

- 1) The purpose of this product is to show regional variations in the sea level for the past 50 years from selected coastal stations for a number of coastal sub-regions of the Black Sea. Overall, the product quality score is **good (3)**. The number of useful sea-level time series is low and does not cover the entire Black Sea coast. Five coastal sub-regions have been identified by considering the geographical locations of available coastal stations and the physical characteristics of the Black Sea. Sea Level trends for the last 50 year for the 5 sub-regions are calculated by using yearly data from Batumi, Burgas, Coastanza, Poti, Sevastopol, Tuapse and Varna coastal stations from the <http://www.psmsl.org/data/obtaining/> portal for the designed period.

- 2) The sea level (ASLVMNMO) is the most important characteristic for the product quality.
- 3) Quality elements that affect the quality of this product are:

- **time extent**
- **time completeness**
- **geographical location of available coastal stations**
- **sampling methods and accuracy of the measurements**

Time series data are often affected by significant gaps. Moreover, local land motions affect the accuracy of local sea level observations. For these reasons, statistical errors are large relative to the trend itself; for instance, the 50 years trend for sub-region 3 (Sevastopol station) is  $-1.4 \pm 1.1$  mm/y and the 50 years trend for sub-region 5 (Poti and Batumi stations) is  $6.6 \pm 7.7$  mm/y (error corresponding to 97.5% confidence).

- 4) The limitations on the quality of the Targeted Product due to the input dataset used (fitness for use) are related to their time extent and completeness and the geographical location of available coastal stations: time series are often affected by significant time gaps and/or do not include enough data for a reliable estimation of 50-year trends and available coastal stations do not cover the entire Black sea coastline.
- 5) The characteristic ASLVMNMO used to generate this product and the dataset used (PSMSL) fail to meet the scope of the Targeted Product.
- 6) Gaps are represented by
  - a) low number of available coastal stations in the Black Sea
  - b) relatively short time span of some of the available time series
  - c) frequently missing monthly means

#### BLACKSEA\_CH5\_Product\_04

- 1) The purpose of this product is to show regional variations in the sea level for the past 100 years from selected coastal stations for a number of coastal sub-regions of the Black Sea. Overall, the product quality score is **good (3)**. The number of useful sea-level time series is low and does not cover all the Black Sea coast. Five coastal sub-regions have been identified by considering the geographical locations of available coastal stations and the physical characteristics of the Black Sea. Sea Level trends for the last 100 year for the 5 sub-regions are calculated by using yearly data from Batumi, Burgas, Costanza, Poti, Sevastopol, Tuapse and Varna coastal stations from the <http://www.psmsl.org/data/obtaining/> portal for the designed period.
- 2) The sea level (ASLVMNMO) is the most important characteristic for the product quality.
- 3) Quality elements that affect the quality of this product are:

- **time extent**
- **time completeness**
- **geographical location of available coastal stations**
- **sampling methods and accuracy of the measurements**

Time series data are often affected by significant gaps. Moreover, local land motions affect the accuracy of local sea level observations. For these reasons, statistical errors are very large relative to the trend itself; for instance, the 100 years trend for sub-region 2 (Costanza station) is  $1.3 \pm 2.1$  mm/y and the 100 years trend for sub-region 3 (Sevastopol station) is  $1.4 \pm 2.0$  mm/y (error corresponding to 97.5% confidence).

- 4) The limitations on the quality of the Targeted Product due to the input dataset used (fitness for use) are related to their time extent and completeness and the geographical location of available coastal stations: time series are often affected by significant time gaps and/or do not include enough data for a reliable estimation of 100-year trends and available coastal stations do not cover the entire Black sea coastline.
- 5) The characteristic ASLVMNMO used to generate this product and the dataset used (PSMSL) sufficiently meet the scope of the Targeted Product.
- 6) Gaps are represented by
  - a) low number of available coastal stations in the Black Sea
  - b) relatively short time span of some of the available time series
  - c) frequently missing monthly means

### BLACKSEA\_CH5\_Product\_05

- 1) The purpose of this product is to show variations in the sea level for the past 10 years from selected coastal stations for each NUTS3 of the Black Sea. Overall, the product quality score is **sufficient (4)**. The number of useful sea-level time series is low and does not cover all the Black Sea coast. Data are available for 4 NUTS3 zones in Turkey. Sea Level trends for the last 10 year for 4 NUTS3 zones in Turkey are calculated by using yearly data from Sile, Igneada, Sinop and Trabzon coastal stations from TUDES data set.
- 2) The sea level (ASLVMNMO) is the most important characteristic for the product quality.
- 3) Quality elements that affect the quality of this product are:
  - **time extent**
  - **time completeness**
  - **geographical location of available coastal stations**
  - **sampling methods and accuracy of the measurements**

Time series data are often affected by significant gaps. Moreover, local land motions affect the accuracy of local sea level observations. For these reasons, statistical errors are very large relative to the trend itself; for instance, the 10 years trend for TR100 zone (Sile station) is  $0.06 \pm 0.26$  mm/y and the 10 years trend for TR901 zone (Trabzon station) is  $0.06 \pm 0.23$  mm/y (error corresponding to 97.5% confidence).

- 4) The limitations on the quality of the Targeted Product due to the input dataset used (fitness for use) are related to their time extent and completeness and the geographical location of available coastal stations: time series are often affected by significant time gaps and/or do not include enough data for a reliable estimation of 10-year trends and available coastal stations do not cover the entire Black sea coastline.
- 5) The characteristic ASLVMNMO used to generate this product and the dataset used (PSMSL) fail to meet the scope of the Targeted Product.
- 6) Gaps are represented by
  - a) low number of available coastal stations in the Black Sea
  - b) relatively short time span of some of the available time series
  - c) frequently missing monthly means

### BLACKSEA\_CH5\_Product\_06

- 1) The purpose of this product is to show variations in the sea level for the past 50 years from selected coastal stations for each NUTS3 of the Black Sea. Overall, the product quality score is **inadequate (5)**. The number of useful sea-level time series is extremely low and is not sufficient to cover all the Black Sea coast. Data are available only for 3 NUTS3 zones, which occupies less than 10% of the coastline. Sea Level trends for the last 50 year for those 3 NUTS3 zones are calculated by using yearly data from Costanza, Varna and Burgas coastal stations from PSMSL dataset.
- 2) The sea level (ASLVMNMO) is the most important characteristic for the product quality.
- 3) Quality elements that affect the quality of this product are:

- **time extent**
- **time completeness**
- **geographical location of available coastal stations**
- **sampling methods and accuracy of the measurements**

Time series data are often affected by significant gaps. Moreover, local land motions affect the accuracy of local sea level observations. For these reasons, statistical errors are very large relative to the trend itself; for example, the 50 years trend for BG341 zone (Burgas station) is  $0.2 \pm 2.6$  mm/y (error corresponding to 97.5% confidence).

- 4) The limitations on the quality of the Targeted Product due to the input dataset used (fitness for use) are related to their time extent and completeness and the geographical location of available coastal stations: time series are often affected by significant time gaps and/or do not include enough data for a reliable estimation of 50-year trends and available coastal stations do not cover the entire Black sea coastline.
- 5) The characteristic ASLVMNMO used to generate this product and the dataset used (PSMSL) fail to meet the scope of the Targeted Product.
- 6) Gaps are represented by
  - a) low number of available coastal stations in the Black Sea
  - b) relatively short time span of some of the available time series
  - c) frequently missing monthly means

## BLACKSEA\_CH5\_Product\_07

- 1) The purpose of this product is to show variations in the sea level for the past 100 years from selected coastal stations for each NUTS3 of the Black Sea. Overall, the product quality score is **inadequate (5)**. The number of useful sea-level time series is extremely low and is not sufficient to cover all the Black Sea coast. Data are available only for 3 NUTS3 zones, which occupies less than 10% of the coastline. Sea Level trends for the last 100 year for those 3 NUTS3 zones are calculated by using yearly data from Costanza, Varna and Burgas coastal stations from PSMSL dataset.
- 2) The sea level (ASLVMNMO) is the most important characteristic for the product quality.
- 3) Quality elements that affect the quality of this product are:
  - **time extent**
  - **time completeness**
  - **geographical location of available coastal stations**
  - **sampling methods and accuracy of the measurements**

Time series data are often affected by significant gaps. Moreover, local land motions affect the accuracy of local sea level observations. For these reasons, statistical errors are very

large relative to the trend itself; for example, the 100 years trend for RO223 zone (Costanza station) is  $1.3 \pm 2.1$  mm/y and the 100 years trend for BG341 zone (Burgas station) is  $1.8 \pm 2.5$  mm/y (error corresponding to 97.5% confidence).

- 4) The limitations on the quality of the Targeted Product due to the input dataset used (fitness for use) are related to their time extent and completeness and the geographical location of available coastal stations: time series are often affected by significant time gaps and/or do not include enough data for a reliable estimation of 50-year trends and available coastal stations do not cover the entire Black sea coastline.
- 5) The characteristic ASLVMNMO used to generate this product and the dataset used (PSMSL) fail to meet the scope of the Targeted Product.
- 6) Gaps are represented by
  - a) low number of available coastal stations in the Black Sea
  - b) relatively short time span of some of the available time series
  - c) frequently missing monthly means

### BLACKSEA\_CH5\_Product\_08

- 1) The purpose of this product is to show variations in the sediment mass balance for the past 10 years. Overall, the product quality score is **inadequate (5)**. The number of available time series is extremely low (only two regions for the Georgian coast, Poti and Adjara) and hence it is not sufficient to cover all or even majority of the Black Sea coast. Additionally, the sampling frequency is once in 10 years: this means for this product we do not have a time series as we only have one observation (covering 10% of the total period, if we consider yearly data).
- 2) The Seabed – Riverbed/Coastal geomorphology is the most important characteristic for the product quality.
- 3) Quality elements that affect the quality of this product are:
  - **sampling frequency**
  - **number of available coastal stations**
  - **geographical location of available coastal stations**

Time-series include decadal data (10 years mean values). This means that both Poti and Adjara regions datasets have only one observation (10% of the total period, if we consider yearly data). Therefore, the trend of those datasets can not be calculated, since to define the trend of a dataset it is needed that the dataset includes more than 1 value.

- 4) The limitations on the quality of the Targeted Product due to the input dataset used (fitness for use) are related to their sampling frequency and the geographical location and number of available coastal stations.
- 5) The characteristic Seabed – Riverbed/Coastal geomorphology used to generate this product and the dataset used (Tbilisi State University dataset) fail to meet the scope of the Targeted Product.
- 6) Gaps are represented by
  - a) low number of available coastal stations in the Black Sea
  - b) low sample frequency.

## BLACKSEA\_CH5\_Product\_09

- 1) The purpose of this product is to show variations in the sediment mass balance for the last 50 years. Overall, the product quality score is **inadequate (5)**. The number of available time series is extremely low (only two regions for the Georgian coast, Poti and Adjara) and hence it is not sufficient to cover all or even majority of the Black Sea coast. Additionally, the sampling frequency is 10 years.
- 2) The Seabed – Riverbed/Coastal geomorphology is the most important characteristic for the product quality.
- 3) Quality elements that affect the quality of this product are:
  - **time completeness**
  - **sampling frequency**
  - **number of available coastal stations**
  - **geographical location of available coastal stations**

Time-series include decadal data (10 years mean values). This means that for Poti region we have 2 observations (4% of the total period, if we consider yearly data) and for Adjara region we have 6 observations (12% of the total period, if we consider yearly data) to compute the 50 years sediment mass balance trend. Our scientific opinion is that the trend of a dataset which includes a very small coverage of the total range of data (less than 10%) can not be considered useful for statistical analysis. Therefore, this product can not be done.

- 4) The limitations on the quality of the Targeted Product due to the input dataset used (fitness for use) are related to their sampling frequency and the geographical location and number of available coastal stations.
- 5) The characteristic Seabed – Riverbed/Coastal geomorphology used to generate this product and the dataset used (Tbilisi State University dataset) fail to meet the scope of the Targeted Product.
- 6) Gaps are represented by
  - a) low number of available coastal stations in the Black Sea
  - b) low sample frequency.

## BLACKSEA\_CH5\_Product\_10

- 1) The purpose of this product is to show variations in the sediment mass balance for the last 100 years. Overall, the product quality score is **inadequate (5)**. The number of available time series is extremely low (only two regions for the Georgian coast, Poti and Adjara) and it is not sufficient to cover all the Black Sea coast. Additionally, the sampling frequency is 10 years.
- 2) The Seabed – Riverbed/Coastal geomorphology is the most important characteristic for the product quality.
- 3) Quality elements that affect the quality of this product are:
  - **time extent**
  - **time completeness**
  - **sampling frequency**
  - **number of available coastal stations**

▪ **geographical location of available coastal stations**

Time-series include decadal data (10 years mean values). This means that for Poti region we have 2 observations (2% of the total period, if we consider yearly data) and for Adjara region we have 6 observations (6% of the total period, if we consider yearly data) to compute the 100 years sediment mass balance trend. Our scientific opinion is that the trend of a dataset which includes a very small coverage of the total range of data (less than 10%) can not be considered useful for statistical analysis. Therefore, this product can not be done.

- 4) The limitations on the quality of the Targeted Product due to the input dataset used (fitness for use) are related to their time extent, completeness and sampling frequency and the geographical location and number of available coastal stations.
- 5) The characteristic Seabed – Riverbed/Coastal geomorphology used to generate this product and the dataset used (Tbilisi State University dataset) fail to meet the scope of the Targeted Product.
- 6) Gaps are represented by
  - a) low number of available coastal stations in the Black Sea
  - b) low sample frequency.
  - c) relatively short time span of some of the available time series
  - d) frequently missing observations