CERTO
Copernicus Evolution – Research for harmonised and Transitional water Observation

Tamar Estuary case study

Plymouth Sound is a visually stunning natural harbour fed by two estuary systems, that of the Tamar River and the smaller River Plym, which flow into the coastal shelf waters of the Western English Channel. The Tamar Estuary Nature Reserve is designated as a Site of Special Scientific Interest, a European Special Area of Conservation, an Area of Outstanding Natural Beauty and a UNESCO World Heritage Site as part of the Cornwall and West Devon Mining Landscape. Marine laboratories have sampled the Sound waters for well over a century, now representing the internationally important Marine Research Plymouth cluster.

The Sound is home to the Devonport Dockyard, the largest naval base in Western Europe, as well as commercial ports, a substantial national fishing fleet, and a global hub for marine technology and leisure industries. The unique waters of Plymouth Sound have been designated the UK's first National Marine Park.

CERTO in the Tamar

CERTO has advanced water quality monitoring in the Tamar Estuary by combining historical data analysis with innovative collection and interpretation techniques. CERTO supports the marine park goals to encourage greater prosperity and engagement with the marine environment through addressing water quality concerns and promoting the well-being of the estuary and sound waters.

CERTO products have been used to evaluate seasonal changes in turbidity and chlorophyll within the Yealm Estuary and associated nearshore waters, aiming to help understand biogeochemical effects of riverine inputs from the catchment, as influenced by urban, industrial and agricultural practises, including climate change.

> *"Frankly this is more than I had dared hope for, and I'm distinctly excited by future higher resolution data. Current outputs seem adequate for system scale analyses such as river water flow and quality (turbidity, N, P, etc.) to temporal changes in remotely-sensed measures of chl-a and SPM"*
>
> *Dr Anthony Hawkins, River Coordinator, Yealm Estuary to Moor Project*

Benefits

For regulatory authorities:

- Enhanced water quality monitoring
- Open access to near-real-time satellite data
- Assess effects of storm flooding
- Early detection of potential harmful events, such as algal blooms
- Enhance recreation through transparent water resource management
- Inform policy decisions for sustainable development

For local residents:

- Assurance of clean water for recreation
- Protection of the natural environment
- Foster sustainable tourism and the local economy
- Open access to environmental data

What is CERTO?

CERTO (Copernicus Evolution - Research for harmonised and Transitional water Observation) is an EU Horizon-2020 project that aims to improve water quality monitoring in support of EU directives. The project brings together industry, monitoring agencies, and scientists to develop innovative cross-cutting indicators that can be applied to coastal, transitional, and inland waters. By integrating *in situ* sampling and historical records with satellite data CERTO advances water quality data collection and interpretation across diverse aquatic environments.

Advancing water quality monitoring

The CERTO project has advanced water quality monitoring through innovative use of water colour data from the Copernicus satellites. By categorising water types based on optical signatures, CERTO has significantly improved water quality assessment. This approach, currently being used across six European estuaries, has the potential to extend globally, creating a comprehensive network of water monitoring.

CERTO provides near-real-time and on-request data through its portal. It meets the immediate needs of researchers and stakeholders while enriching the pool of assessment tools with new indicators for more accurate and precise evaluations.

Sentinel 2 satellite image of Plymouth Sound region showing a plume from the River Tamar.

The CERTO data portal

CERTO has created a prototype system, designed to integrate seamlessly with existing Copernicus services. The prototype will be scaled up to cover all UK coastal and transitional waters within the UK EO Climate Information Service. This will further provide remote sensing data to the Vis4Sea project, a collaboration with CSIRO AquaWatch Australia. CERTO will specifically provide products to quantify flooding effects on seagrass beds and mudflats in Plymouth Sound.

CERTO data can be accessed through a dedicated data visualisation portal, providing up-to-date information and crucial insights into water quality. This offers near-real-time data in an easy to access format.

Whether you're conducting scholarly research, supporting environmental initiatives, or seeking knowledge about the state of local water systems, the portal is a valuable resource that enables active participation in water quality monitoring and conservation efforts.

The CERTO data visualisation portal: https://engage.certo-project.org/data/

CERTO

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