

General feedback

The workshop generically targeted the validation of satellite-derived water quality products in coastal and inland waters. Such a validation effort can be seen within the framework of specific validation programs, or as a contribution from ongoing research/monitoring programs.

In the first case, comprehensive reference measurements should be produced to assess primary (i.e., radiometric) and derived (i.e., high level) data products.

In the second case, any accurate measurement, still linked to data products, would be relevant.

During the whole workshop, it did not emerge the proposal/concept of setting up a comprehensive validation program. But rather the inclination to exploit the community effort to contribute to validation activities within the framework of ongoing research/monitoring programs.

Field measurements

The session on field measurements was centered on “radiometry”. Not because radiometric measurements are the only relevant, but rather because they are fundamental in any comprehensive validation program. The main objective was to highlight the efforts required for comprehensive, calibration/characterization of field instruments, data reduction processes and uncertainty analysis.

The following statements are not just sentences. They should be seen as fundamental rules:

Good (practically useful) data do not collect themselves. Neither do they magically appear on one’s desk, ready for analysis and lending insight into how to improve processes (S.B. Vardemann and J.M. Jobe 2016)

A measurement of any kind is incomplete unless accompanied with an estimate of the uncertainty associated with that measurement. (J.M. Palmer and B.G. Grant 2009)

... adequately sampled, carefully calibrated, quality controlled, and archived data for key elements of the climate system will be useful indefinitely (Wunsch, R.W. Schmitt, and D.J. Baker 2013)

Questions and Answers following the “field measurements” session

The discussion highlighted the community interest in prescriptive guidelines supporting the execution of in situ measurements for the validation of satellite data products (i.e., the need for methods versus protocols). The request is fully explained by the envisaged benefit of obtaining field support by personnel not necessarily expert in many diverse measurement disciplines.

Another element put forward was the affordability of commercial instruments by the community (mostly in terms of costs). The request, however, may conflict with the capability of ensuring high quality to field measurements supporting validation activities. In fact, comprehensive and generally expensive instrument characterizations, which are essential to minimize measurement errors and allow for the computation of uncertainty budgets, should be considered a fundamental element of any validation program. Still, it is recognized that the high costs associated with state-of-the-art instruments, characterizations and uncertainty analysis, need to be considered a community effort (and difficult to be sustained outside major measurement and validation programs).

Breakout session on field measurements

The group recognized the fundamental importance of radiometric measurements for the validation of satellite data products. Still, any additional bio-geochemical quantity such as pigments concentrations or absorption of colored dissolved organic matter, is necessary to evaluate higher level data products from satellite observations. Notably, uncertainty targets for field measurements should take into account those defined for satellite data products.

The need for methods (versus protocols), often restricted to the use of specific instruments, was considered a major requirement for extended validation activities. This need should be complemented by training ideally including inter-comparison activities essential to verify the implementation of methods. Community processors for data reduction and analysis should complement the adoption of such a scheme for field operations.