Abstract 16. **On the implementation of an integrated platform for phytoplankton automated observation in European coastal waters: a JERICO-NEXT (H2020) Joint Research Action.**

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In order to better understand phytoplankton temporal and spatial distribution in coastal systems, automated *in vivo* approaches are being deployed since the last decade. These innovative techniques provide new insights into the detection of phytoplankton community changes affecting growth rates, size structure, taxonomic and/or pigmentary composition, which can occur at different time and spatial scales, evidencing rapid as well as long-term changes in environmental conditions. When implemented in automated environmental monitoring platforms, as fixed stations, moorings, research vessels and/or ships of opportunity, these techniques can represent valuable "near-real time" and "early-warning" systems of community changes which can evidence changes in ecosystem state, as the occurrence of blooms and, in particular, of harmful algal blooms (HAB), which can lead to disruption of marine food webs and mass mortalities of marine organisms and which are of special interest in areas of fishing, aquaculture and tourism. Therefore, there is need to improve the discrimination and operability of automated techniques addressing phytoplankton diversity (at nearly taxonomical and/or functional levels) and productivity. In the frame of the Joint European Research Infrastructure network for Coastal Observatories – Novel Expertise (JERICO-Next – H2020, 2015-2019), scientists inter compare, work on technical and analytical improvements and apply a combination of phytoplankton automated observation approaches, based on single cell/particle or bulk optical characteristics, in several European coastal systems ranging from oligotrophic (West Mediterranean) to mesotrophic (southern Bay of Biscay, Celtic seas) and eutrophic systems (eastern Channel, southern North Sea, Skagerrak/Kattegat, Baltic Sea), characterised by different phytoplankton communities, timing and extension of blooms (and potential HABs developments of dinoflagellates, diatoms, haptophytes, cyanobacteria). Three main groups of techniques, image in-flow or *in situ* acquisition and analysis, pulse shape-recording automated flow cytometry, as well as multispectral and variable fluorometry and spectrophotometry, are being critically explored and implemented in different sites and platforms. A summary of the main results gathered by a combination of these techniques is presented and discussed.