Seagrasses or caged mussels to bioassess the contamination rate of Mediterranean coastal waters? That is the question

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Biological indicators have the capacity to integrate the temporal changes of contaminants, concentrations or fluxes over various time-scales, and are thus considered as interesting tools for water quality biomonitoring. Since the mid-70ies, French programs have developed water monitoring approaches based on the use of bivalve molluscs; and recently the natural background and the extent of water contamination were bioassessed at the scale of the whole western Mediterranean. But even if bivalve molluscs are viewed as reliable bioindicators, their use is not always made easy as a result of their absence in numerous coastal regions that force their transplantation (cages) during several months before their sampling and analysis. This weakness led several scientists to evaluate the bioindicator abilities of other marine organisms. Seagrasses, whose ability to bioaccumulate contaminants proportionally to environmental contamination levels has been clearly demonstrated, have thus been proposed as an appropriate alternative tool for coastal water quality assessment. Very little studies have however so far considered the combined utilization of these two groups of bioindicator organisms, *i.e.* caged bivalve molluscs and seagrasses. In the framework of the STARECAPMED project, we therefore compared and discussed the bioaccumulation of trace elements in the Neptune grass *Posidonia oceanica* and in caged Mediterranean mussels *Mytilus galloprovincialis*. The sampling was performed at the scale of the western Mediterranean. The two species told two contamination stories which, although sometimes different, showed to be complementary. *P. oceanica* and *M. galloprovincialis* bioaccumulated dissolved trace elements from the water column and thus provided information regarding trace element contamination severity integrated over several days to a few months. Seagrasses, strongly rooted in the sediments, reflected the long-term exposure to trace elements since sediments offer

a degree of time integration over several years to decades. Caged mussels, as filter feeder artificially maintained in the water column, bioaccumulated trace elements from their particulate phase, and therefore gave valuable information regarding continental-terrigenous inputs to coastal waters. In conclusion, seagrasses and mussels should neither supplant, nor substitute, but rather complement each other in order to provide the full time- and space-integrated coastal contamination story of the Mediterranean.