



## **A 9-year continuous monitoring of salinity in the Gironde estuary (S-W France) reveals marked inter-annual variability in marine intrusion**

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Estuaries form a transition zone in which rivers and oceans meet, including both fresh and salt waters. Thus conditions in estuary are more variable than those in either rivers or marine environments. In particular salinity presents a large temporal and lateral variations, depending of the degree of water mixing. The limit of salinity intrusion along an estuary is determined by the balance between the landward transport of salt by tidal processes and its seaward return by freshwater discharges. The major factor that affects the limit of saline intrusion along an estuary is freshwater inflow. In a context of global change, salinity intrusion in estuaries is expected to increase due to the cumulative effect of decrease in freshwater flows (changes in rain rate, decrease of riverine discharge due to upstream land use) and to sea level rises. At present, it is still difficult to establish changes in marine intrusion in estuaries due to the limited available data set.

With its 625 km<sup>2</sup>, the Gironde estuary (S-W France) is one of the largest European estuaries. Since 2004, a real-time continuous system (MAGEST network) records four selected parameters (salinity, turbidity, dissolved oxygen) to establish a reference database of water-quality of this fluvio-estuarine system to address current and future water-quality issues. Here we present in details the 9-year time series of salinity in the Gironde estuary, recorded at four stations representative of the central and up estuary. Not surprisingly there are large difference among the four instrumented stations depending on their localization. But the time-series had allowed to highlight marked inter-annual variability in relation with the local hydrology. This example clearly illustrates the interest of long-term time series to detect potential changes in salinity, related to global changes, from inter-annual variability.