

7. Long term accretion and elevation change rates at salt marshes and reedbeds of the lagoon of Venice

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To evaluate if salt marshes and reedbeds of the lagoon of Venice will be able to cope with predicted sea level rise, accretion and elevation change rates measured over long periods are needed. From 1993 to 2004 fifteen stations equipped with SET (Sedimentation and Erosion Table) and kaolin markers have been installed in the lagoon of Venice. Measurements were taken every three months for the first three years, and with irregular frequency since then. We present here results of measurements, made in summer 2004, at six of those sites.

1) Reedbeds. Two stations were established in 1993; the first one after four years showed an accretion rate of 0.57 cm yr^{-1} and an elevation change of $+0.48 \text{ cm yr}^{-1}$. After 11 years, we measured in the remaining station an accretion of 0.62 cm yr^{-1} and an elevation change of 0.52 cm yr^{-1} . In all the readings vertical accretion outcomes elevation change, suggesting a subsoil compression of about 0.1 cm yr^{-1} is acting.

2) Salt marshes. From 1993 till 2004 vertical accretion ranged between 0.30 and 0.44 cm yr^{-1} , with a mean of 0.40 cm yr^{-1} . The highest values were observed at sites with low elevation above sea level, where halophytes such as *Salicornia veneta* and *Spartina maritima* occurred. The lowest values were recorded at higher elevation sites, with *Limonium narbonense*, *Sarcocornia fruticosa* and *Halimione portulacoides*. Elevation change were always lower than vertical accretion and ranged between $+0.25$ and $+0.44 \text{ cm yr}^{-1}$, with a mean of $+0.36 \text{ cm yr}^{-1}$.

3) Dredge island. At one artificial site, made in 1993, we measured a regular loss of elevation over the first four years (-7.2 cm overall), and since then an increase of about $+0.3 \text{ cm yr}^{-1}$. This is likely due to deposition of sediments carried by high tides; indeed, the same rate of accretion was observed at an adjacent natural salt marshes.

Overall results indicate that: 1) reedbeds have higher accretion rates than most salt marshes 2) among salt marshes, sites at lower elevation have higher accretion rates (not considering here differences among organic and inorganic components) and elevation changes 3) overall, elevation changes are positively and significantly related to accretion rates.