Preliminary results on pH variability in Mali Ston Bay – implications for ocean acidification research

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Global change is having a profound impact on marine ecosystems. In addition to global warming, increasing anthropogenic carbon dioxide emissions are leading to changes in seawater carbonate chemistry, a phenomenon known as ocean acidification. After more than two decades of research, it is now known that species' response to ocean acidification is strongly influenced by natural pH fluctuations in their habitats. In particular, coastal environments are characterized by highly dynamic carbonate chemistry parameters.

We present preliminary data on pH variability in Mali Ston Bay, southeastern Adriatic Sea, an important marine habitat known for the cultivation of the European flat oyster, Ostrea edulis.

Over a ten-month period, pH on the total scale (pH_T) and total alkalinity (TA) were measured alongside temperature and salinity. Additional parameters, including pCO_2, aragonite (ΩAr) and calcite (ΩCa) saturation states, were calculated using the CO2SYS software

In addition to the expected seasonal changes in temperature and salinity (Figure 1), results revealed significant variability in pH (Figure 2) and alkalinity (Figure 3). pH values ranged from 7.75 to 8.05, while the total alkalinity varied between 2680 and 3200 $\mu mol\ kg^{-1}$.
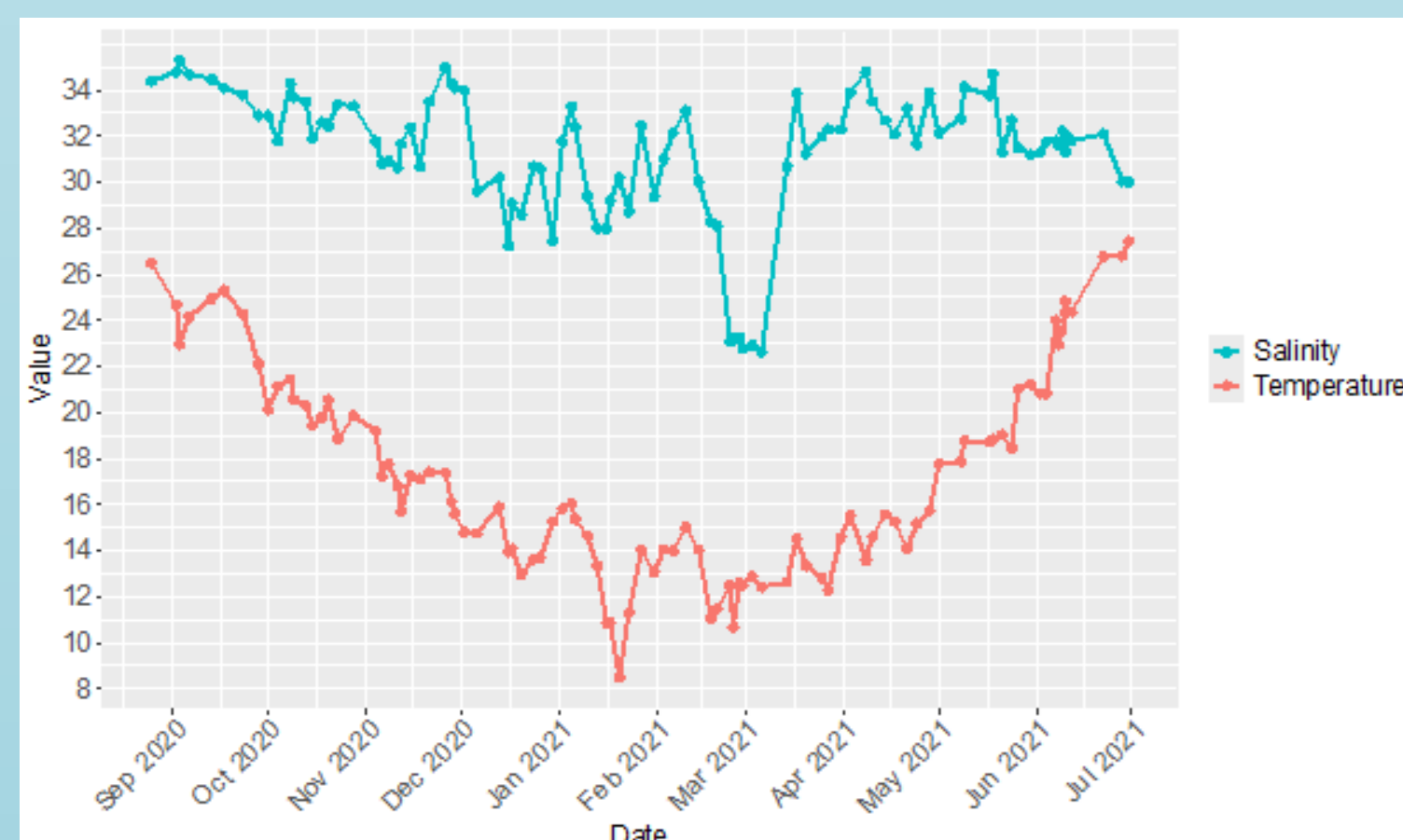

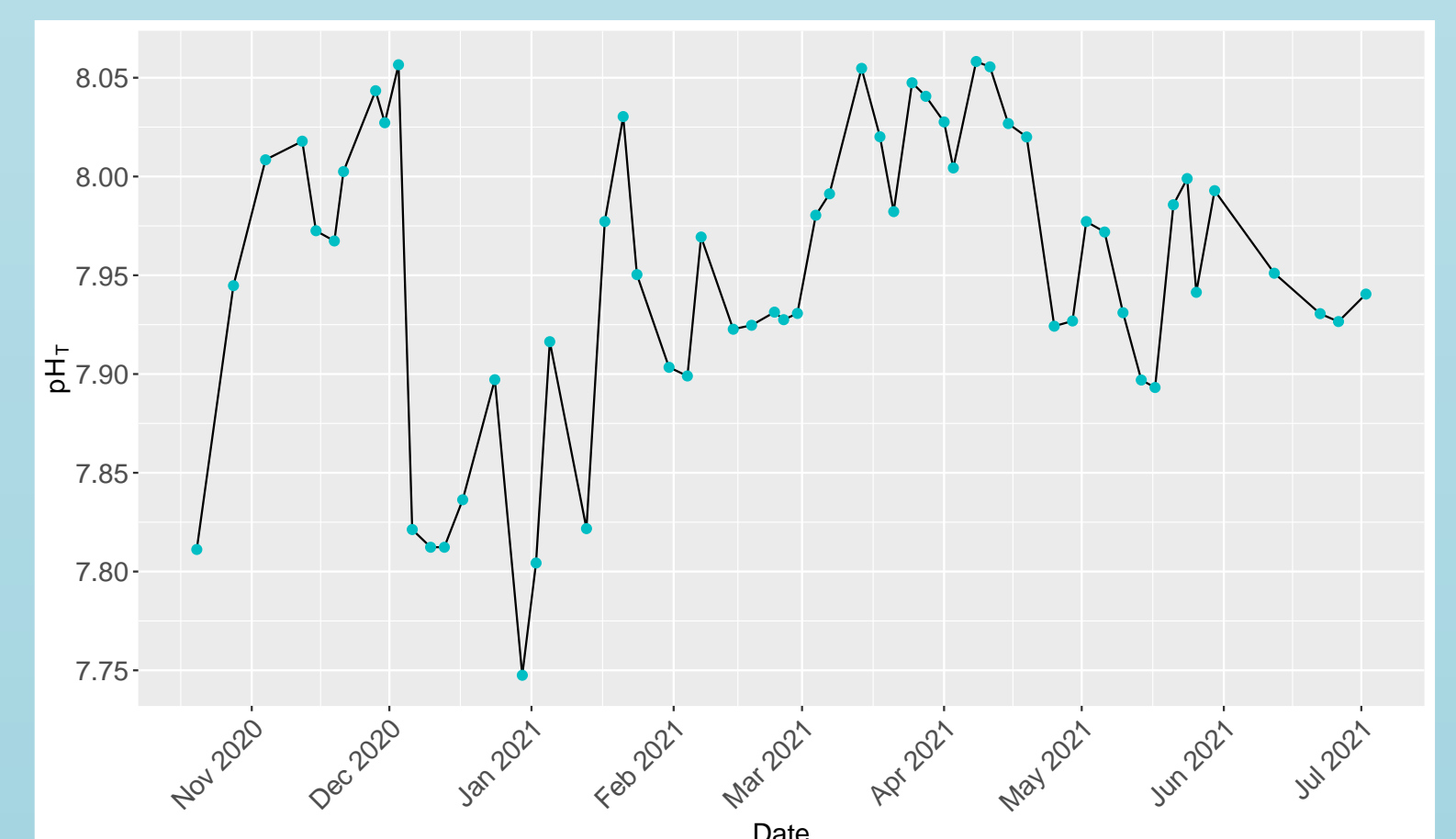Figure 1. Salinity and temperature

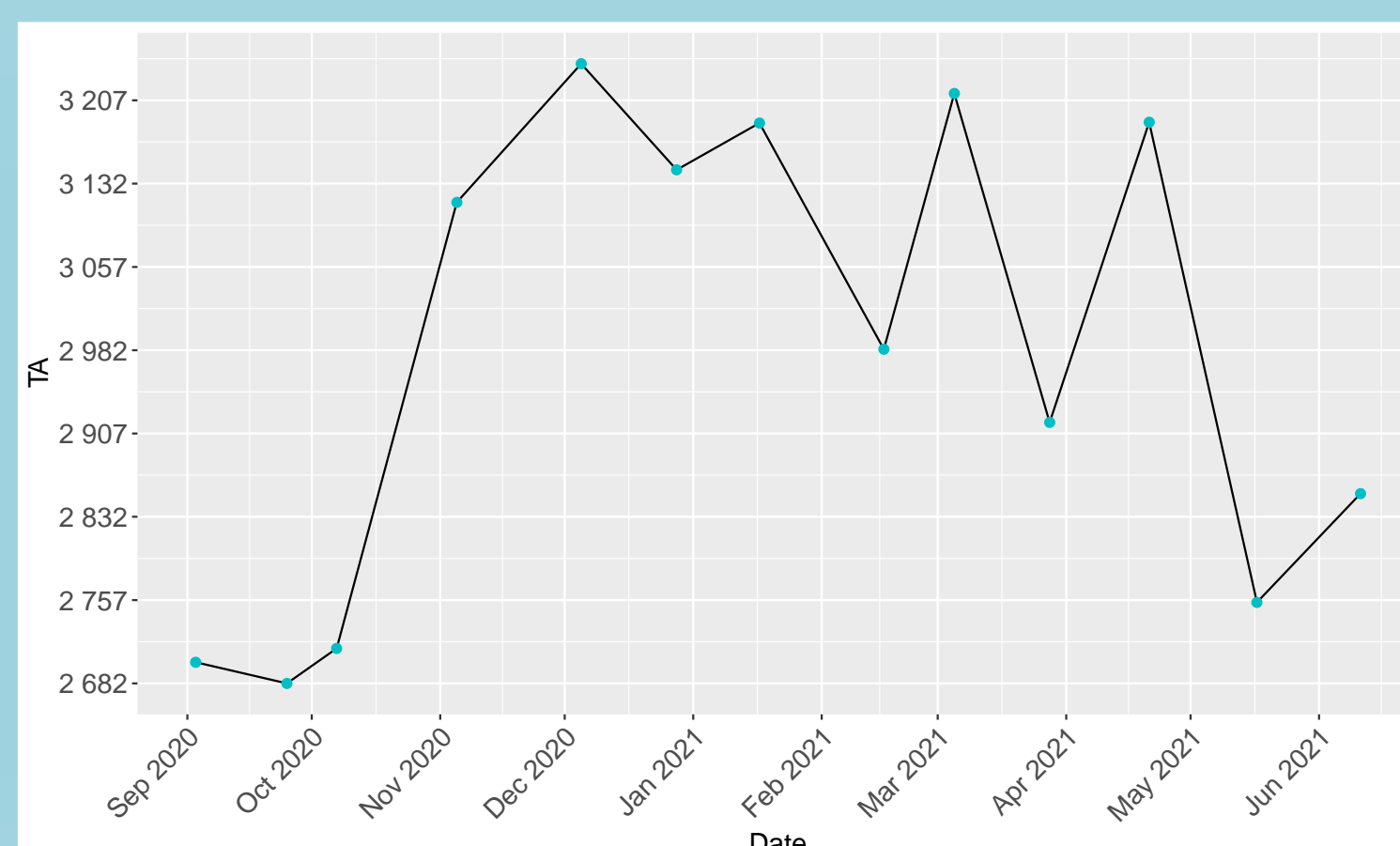Figure 2. pH on a total scale
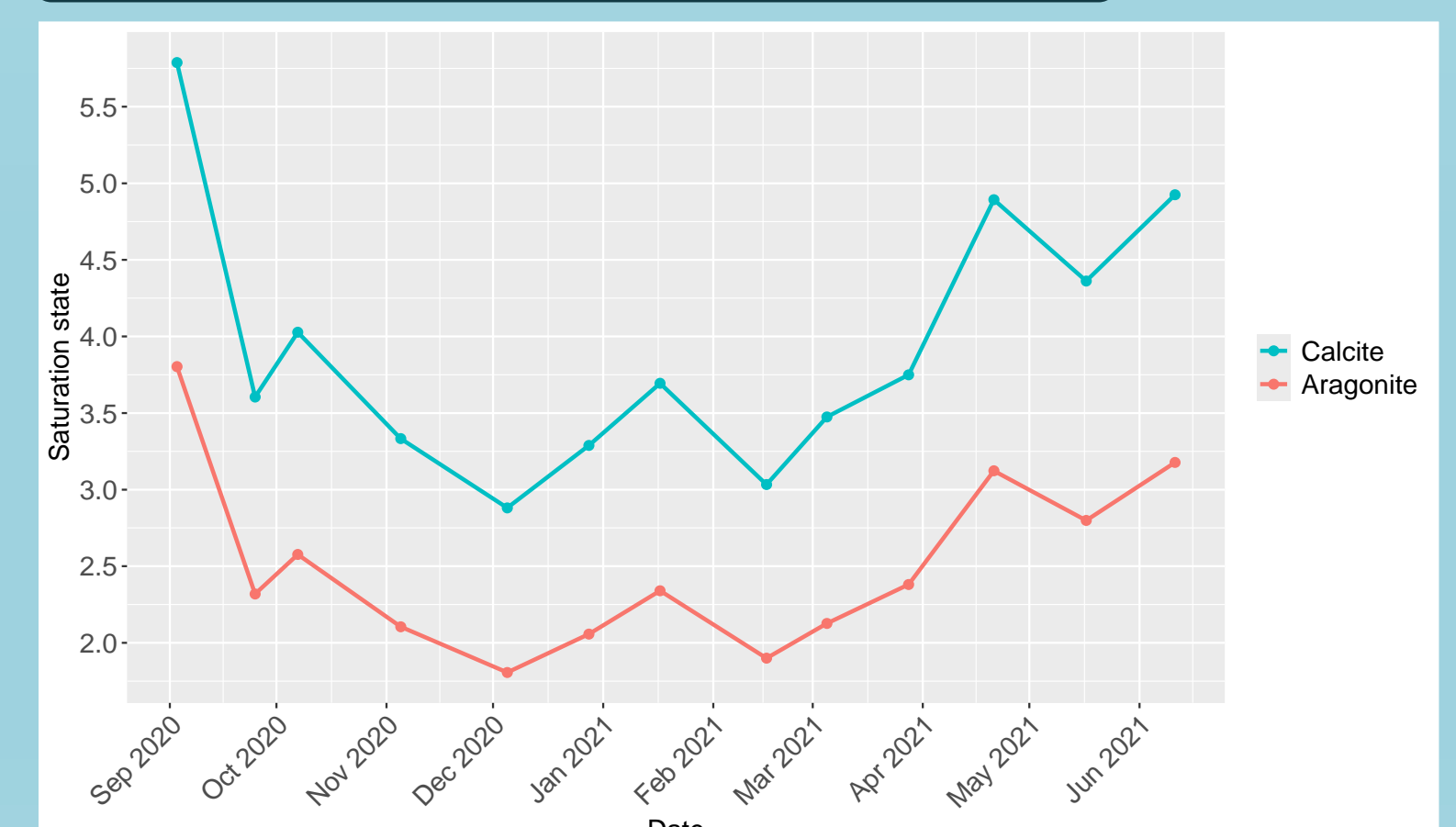

Figure 3. Total alkalinity

Figure 4. Saturatin states of Ca and Ar

These results emphasize the importance of localized monitoring when assessing the potential resilience of species to future seawater conditions. The observed natural variability suggests that populations inhabiting this area might already possess a degree of acclimatization to environmental change, highlighting the need to incorporate such baseline data into future experimental designs.