Acclimatisation of key physiological processes in the cold-water corals *Lophelia pertusa* and *Madrepora oculata* over their ambient temperature range

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The key reef-forming cold-water coral (CWC) species *Lophelia pertusa* and *Madrepora oculata* thrive at contrasting temperature regimes, ranging from deep-sea cold-water bioherms in the northern Atlantic (ca. 4 – 9 °C) to temperate conditions in the Mediterranean Sea (11 – 14 °C). While recent research suggests that environmental parameters, such as seawater density and/or vertical and horizontal transport, as well as availability of particulate food, may represent essential precursors for CWC occurrence, the potential influence of seawater temperature is still unresolved. Seawater temperature may affect CWC key physiological processes, such as growth (i.e. calcification), respiration and dissolved organic carbon (DOC) flux, thus importantly influence the role of CWC as ecosystem engineers. Here, we investigate rates of the above physiological processes in the cosmopolitan CWC species *L. pertusa* and *M. oculata* after mid-term acclimatization periods (1 month) in the laboratory under 3 different temperature conditions (6, 9 and 12 °C). Our results for calcification, respiration as well as DOC net flux rates showed no significant change for corals maintained at between 6 and 12 °C, except for respiration rates of *M. oculata*, which were positively correlated to ambient temperature. These findings reveal an effective acclimatization capacity to persistently modified seawater temperature by both coral species, which may further help to explain their global occurrence over these relatively wide temperature ranges. In addition, species-specific capacity for temperature acclimatization by CWC will likely represent an essential tool to physiologically withstand climate change related temperature anomalies announced for deep-sea habitats. Conclusively, in a warming ocean, reef-forming CWC species with a higher temperature acclimatization capacity may replace thermally intolerant species and further continue to control deep-sea reef functioning by sustaining their ecosystem engineering capacity.