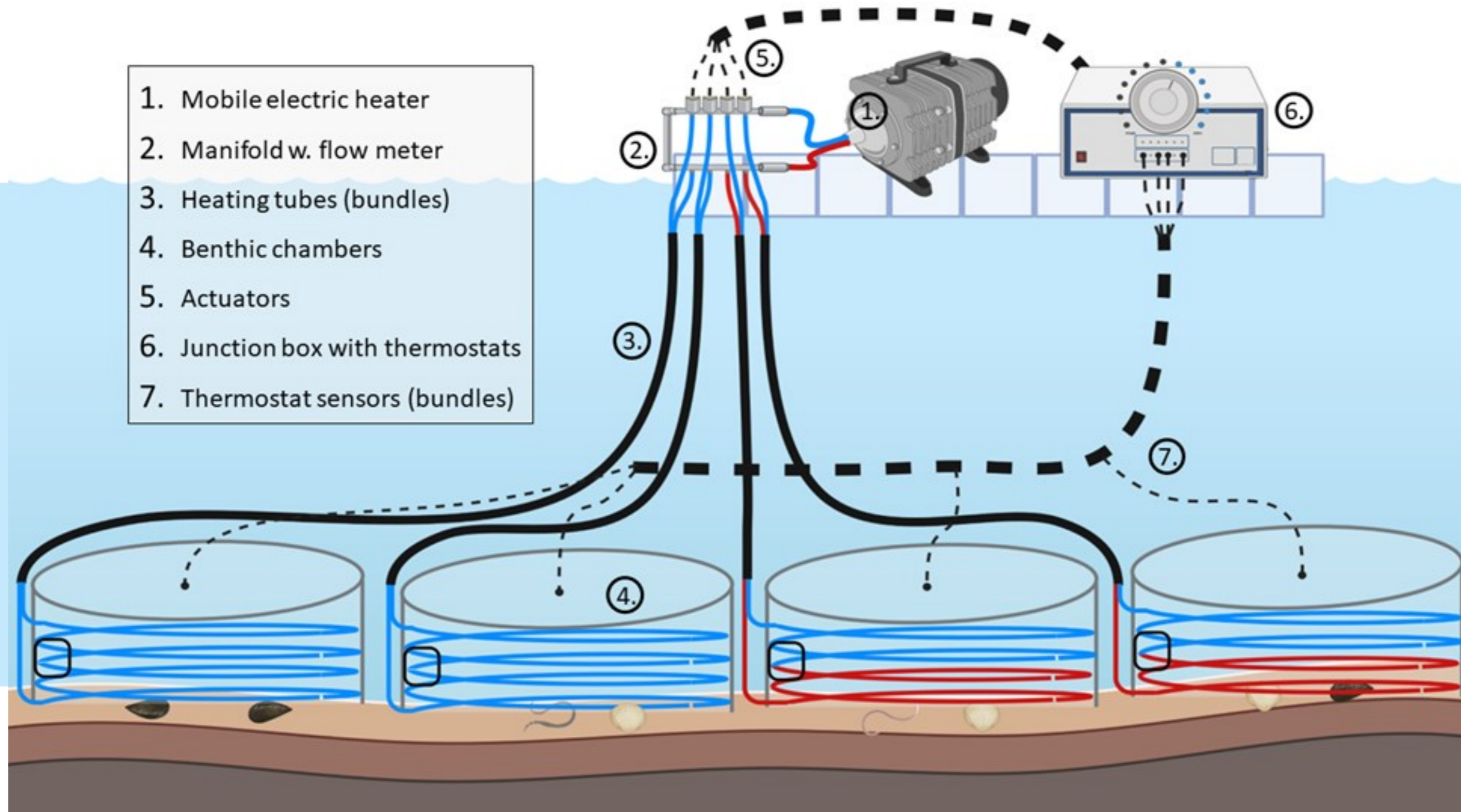


## Investigating the effects of heatwaves on seafloor community structure and ecosystem functioning – novel in situ approaches needed for realistic insights

The temperatures in the last 30 years have **broken multiple historic records**, causing the current climate period to be **significantly warmer** than previous 30-year periods (1931-1960 or 1961-1990). Particularly episodic, extreme events, like **marine heatwaves**, are becoming more frequent. These events can **alter species distribution** and affect **marine ecosystem functioning**, such as **rates and pathways of nutrient cycling** and **ecosystem metabolism**. Yet, the **majority** of insights into the effects of marine heatwaves are either based on **observations** or **laboratory/mesocosm studies**. But to understand **large-scale ecosystem responses**, with their inherent **complexity**, to environmental drivers it is imperative that researchers conduct **field investigations** in natural ecosystems.

We combined **custom-built benthic chambers** and a **domestic underfloor heating** to create

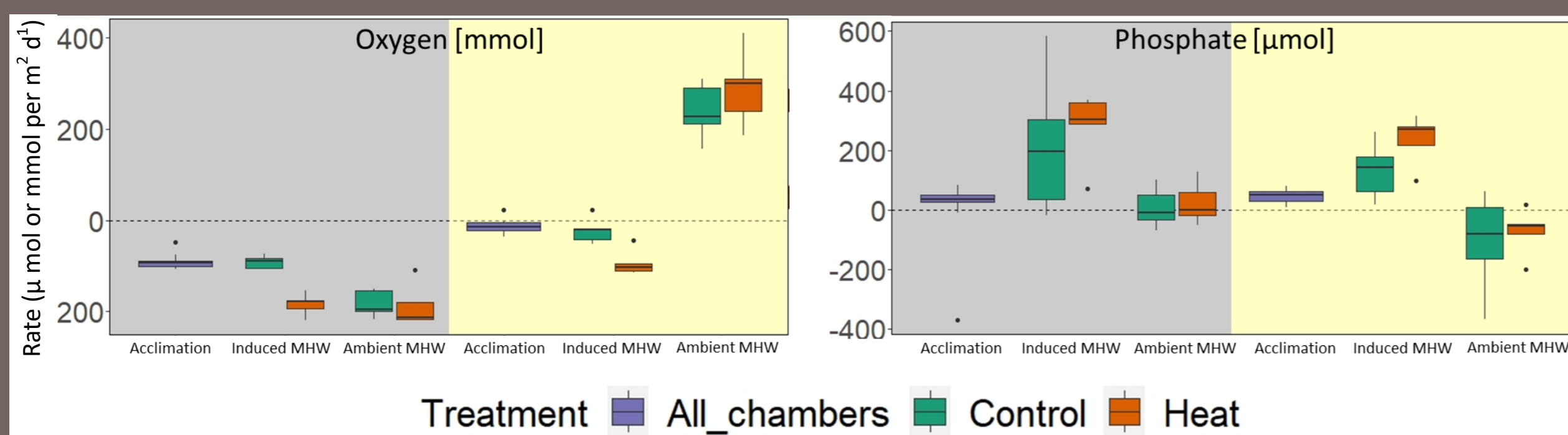
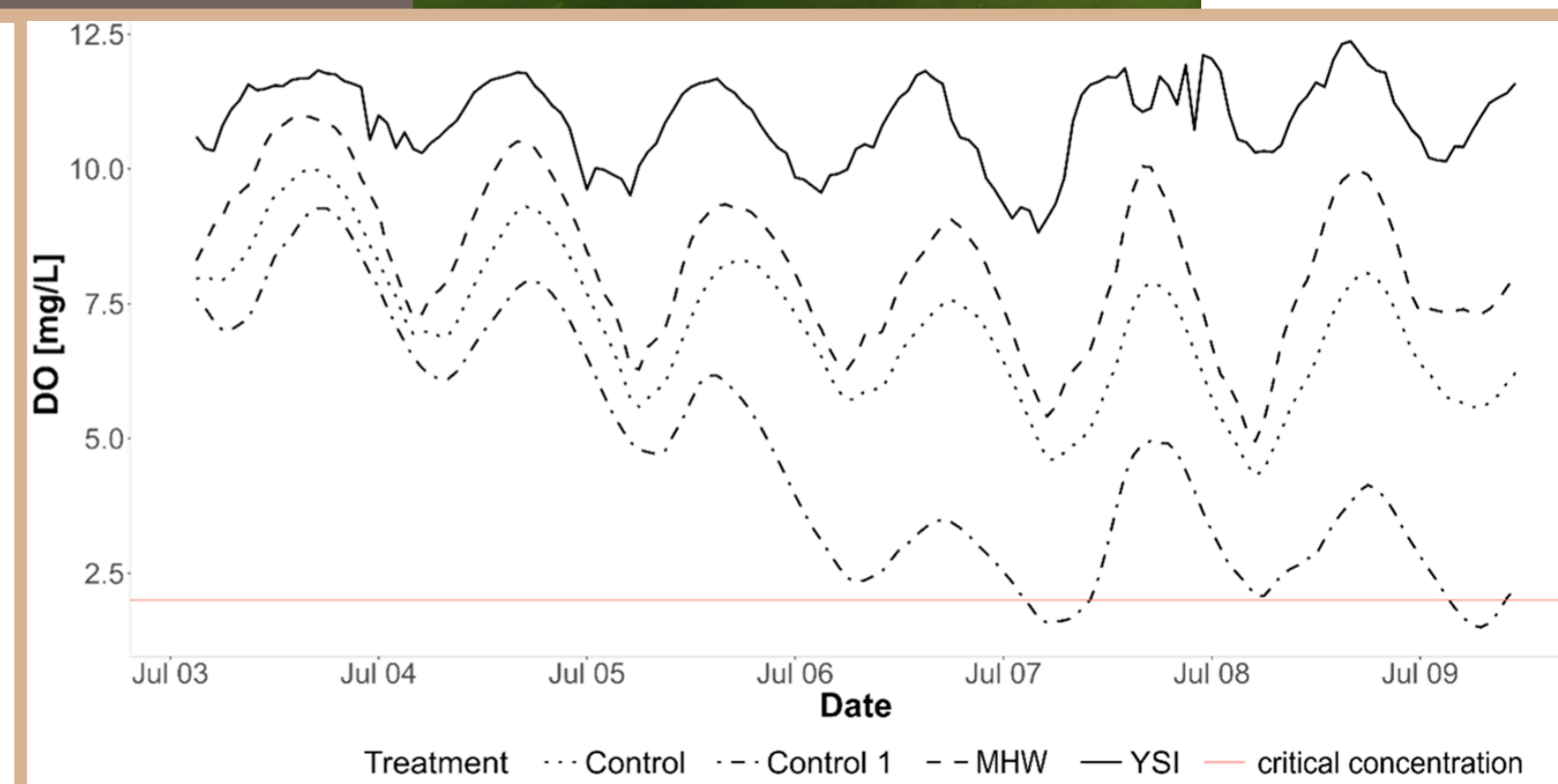
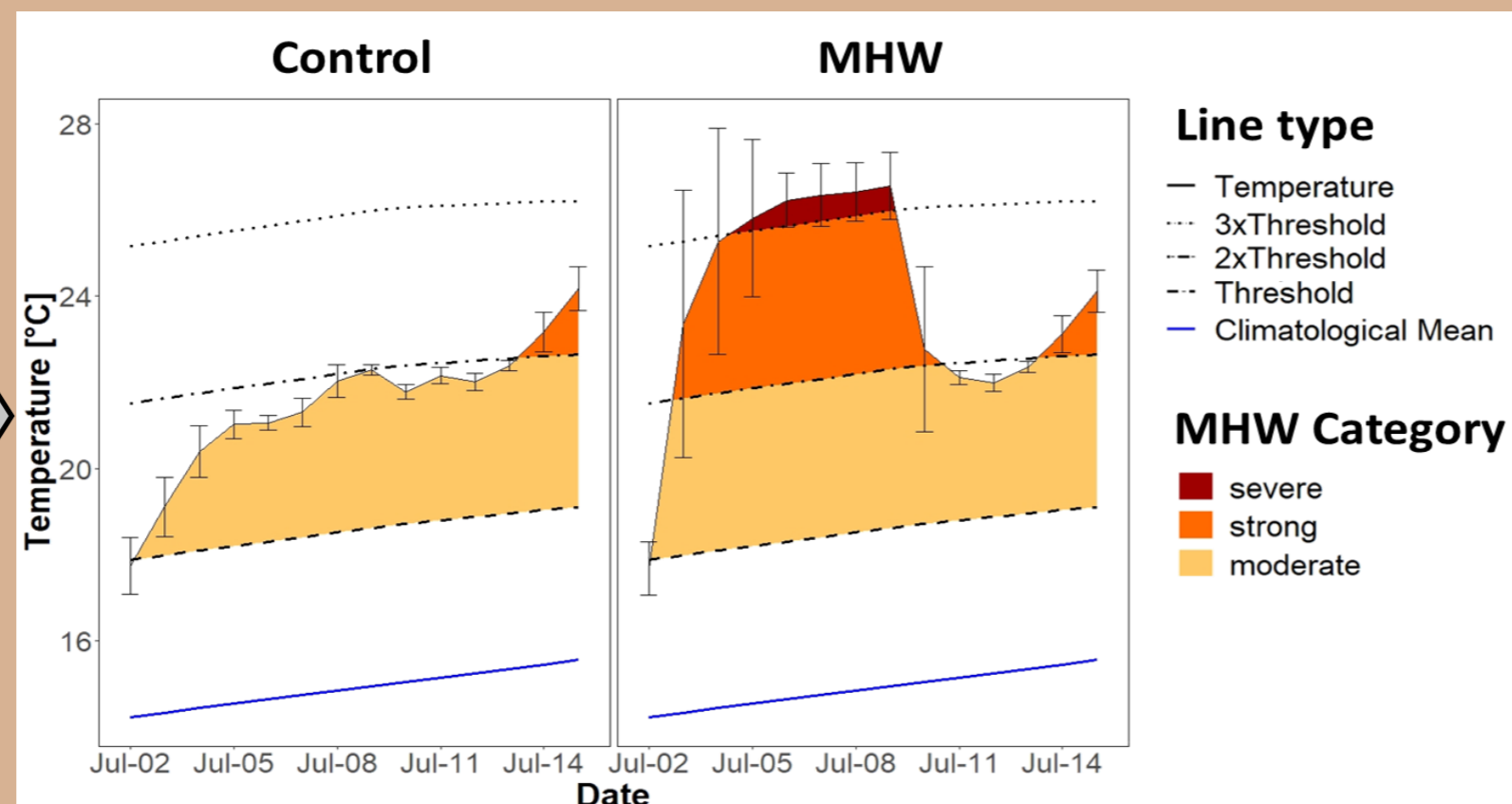
### HOTFLOOR



#### Assessment

The **temperature** of the induced marine heatwave was as **planned and stable**.

**Oxygen** conditions demonstrate **near-natural** conditions key to longer-term investigations



#### Measurement of nutrient fluxes

The system is **suitable** for conducting **in situ incubations** investigating the effects of marine heatwaves on **ecosystem functioning** (nutrient cycling) of **benthic communities**.

The induced marine heatwave **amplified** the predominant **process** of either **consumption** or **production** during light and dark incubations.

**METHOD** In order to measure the nutrient fluxes 6 incubations (each 4h), during which a water sample was taken at the beginning and at the end, were conducted during **night time** (left panel) and **day time** (right panel). The incubations were conducted shortly after the placement when all chambers were at the same temperature (Acclimation), after 5 days of forced heating (Induced MHW), and after another 5 days without additional heating during an intensified natural marine heatwave when all chambers were at ambient heatwave conditions (Ambient MHW).

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