

Cooling and Shading Solutions

These interventions aim to lessen the impact of heat and light stress on corals by enhancing natural shade over the particular areas of the Reef.

Cooling and shading interventions, marine cloud brightening (MCB) and seawater fogging, offer a temporary protective management tool to reduce light intensity and solar radiation over the ocean during marine heatwaves and doldrum conditions.

- MCB: Sprayers use compressed air and high-pressure pumps to atomize seawater to produce cloud condensation nuclei, tiny sea salt particles (aerosols), which are released into the atmosphere and mixed into low-lying clouds, increasing their ability to reflect sunlight
- Fogging: Large nozzle arrays generate a low-lying fog of much larger seawater droplets directly over the ocean during extended periods of still and hot weather

Outcomes to Date

- Rapid MCB technology development including aerosol sprayers, nozzle advancement, methods and instrumentation for quantifying the efficacy in outdoor experiments
- A significant enhancement in our understanding of the role of clouds and meteorology in coral bleaching events
- Comprehensive characterization of both natural and MCB aerosol-cloud interactions over the Reef using multiple airborne, surface based, and earth orbiting instrumentation
- Prototype fogging sprayer developed and tested in field, successful deployment. A single sprayer can generate a short-lived plume and produces a measurable reduction in the incoming sunlight



Next Steps:

- Continued real-world testing to optimise aerosol droplet diameter and understand the response of different cloud types under varied atmospheric conditions
- Development of a working model of atmospheric conditions over the Reef during various synoptic meteorological conditions and assessing the impact on efficacy of MCB
- Validation and improvement of atmospheric models, by integrating field observations
- Consideration of the long-term impact of various optimisation strategies designed to make deployment more viable

