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Extreme ocean weather induced by upstream meandering of the East Australian Current

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We investigate Marine Heat Waves and Marine Cold Spells (MHWs/MCSs) along the east coast of the Australian continent, a western boundary current region with exceedingly complex dynamics. We provide evidence that episodic MHWs/MCSs along the south-east of the Australian continent are driven by upstream variations in the position, but not necessarily the strength, of the East Australian Current, and that these variations are, in turn, controlled by small-scale (100s of kilometers) eddies that propagate into the region from the east. These eddies are able to alternately 'shut-off' and 'turn-on' the poleward transport of warm water by the boundary current in a manner analogous to atmospheric blocking. Precursors to these 'blocks' are detectable as much as 60 days prior to the onset of an event. We will discuss the implications of our results for the early prediction of MHW/MCS events.