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Observations of nonlinear internal wave evolution and mixing from the shelf to the surf zone. KRISTEN DAVIS, GREGORY SINNETT, EMMA REID, University of California, Irvine, Civil Env. Engineering — Internal waves strongly influence the physical and chemical environment of coastal ecosystems worldwide. We report novel observations from a distributed temperature sensing (DTS) system that tracked the transformation of internal waves from the shelf break to the surf zone over a shelf-slope region of a coral atoll in the South China Sea. The spatially-continuous view of the near-bottom temperature field provided by the DTS offers a perspective of physical processes previously available only in laboratory settings or numerical models. Additionally, we report observations of turbulent dissipation during the passage of a shoaling internal wave train and examine the implications for irreversible mixing of subthermocline water into the nearshore region and onto a shallow coral reef. We find that during summer, internal waves shoaling on the shallow atoll regularly transport cold, nutrient-rich water shoreward, altering near-surface water properties on the fore reef. This water is transported shoreward of the reef crest by tides, breaking surface waves and wind-driven _ow, where it signi_cantly alters the water temperature and nutrient concentrations on the reef _at.

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