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Identifying coastal segments susceptible to wave climate change

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Available wave data have been analysed to determine how Australia's offshore wave climate fits into the broader context of climate variability. The dominant wave climate signal on Australia's eastern margin is the El Nino – Southern Oscillation, and on Australia's southern margin is the southern annular mode. Projected changes in offshore wave conditions might be inferred from projected characteristics of these indices. However, as surface ocean waves propagate from the deep water zone towards the coast, they undergo a range of transformations (shoaling, refraction, diffraction, blocking by land, frictional losses at the sea-bed, depth-induced breaking etc). As a consequence, the impacts of projected changes in the offshore wave climate are not necessarily fully experienced at the coast. Some sections of coast may be more sensitive to changes in the offshore wave climate than others. We present a methodology to identify susceptible coasts to wave climate change.
The SWAN wave model is used to downscale offshore wave conditions to the coastal zone, in order to derive indicators of longshore transport, and the divergence of longshore transport as an indicator for the potential for coastal erosion or accretion due to wave conditions. Segments of coast susceptible to changes in wave climate are then identified by locations with large variance of these coastal parameters. The method is being developed to assist the identification of coastal sections which are vulnerable to projected changes in the Australian wave climate, which are currently being prepared.