

Climate change to put dunes on the move

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Dunes on SA's West Coast. Credit: AD Short.

(Phys.org) —The instability of coastal sand dunes – already an issue for Adelaide's suburban beaches – is likely to worsen as sea levels rise with global warming, according to Flinders University Professor Patrick Hesp.

And deprived by human activity of the space to retreat from higher sea levels, Professor Hesp says urban seaside [dunes](#) may eventually be lost to erosion.

Professor Hesp, Strategic Professor of Coastal Studies in the School of the Environment at Flinders, said that globally sea levels are currently increasing by 3.2 millimetres each year.

"While this may not seem much, projections for the year 2100 show an increase at a lowest estimate of 20 to 30 centimetres, ranging up to 190 centimetres for the highest estimates," he said.

Professor Hesp said that the fore dune – the first dune at the back of the beach – has the capacity to move upwards and backwards with [sea level](#) rise, if it has the space.

"The central problem is that the Adelaide coast no longer has that space, because we've built right up to the beach," Professor Hesp said.

"The dunes will be looking to translate landwards, but if you have a seawall at the back of the beach, they have nowhere to go and will erode."

Professor Hesp said some Sydney councils are attempting to forestall the problem by buying up seafront properties to convert them into coastal reserves.

South Australia's coastal dune systems are among the most extensive in the world, Professor Hesp said.

In unpopulated areas, most dunes will gradually move backwards as the sea level rises, mimicking the action of the dunes ahead of the historic [sea level rise](#) following the last Ice Age which brought the shoreline up from 130 metres below its current level.

But a crisis for beaches in coastal towns could come quite quickly, Professor Hesp said.

He said that if rising sea levels are accompanied by the blend of hotter, drier and windier conditions that are predicted as part of climate change, vegetation that helps to stabilise dunes will potentially die off or the vegetation cover will be reduced.

"Sea level rise will destabilise the dunes on the front, which will probably create greater activity, but if, on top of that, there is a few per cent change in rainfall, wind or evapo-transpiration, those things will all lead to greater dune instability."

Because of the number of variables, it is very difficult to predict the degree of severity or the speed of climate change-related effects.

"But we are likely to see more active dune fields than we did, and potentially the breakdown of some currently stabilised dune fields," he said.

Provided by Flinders University

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