The Earth is warming and the sea level is rising.
Most of this warming has occurred since the 1970s, with the last three decades being the warmest ever recorded since detailed record keeping began in 1850.

Average maximum temperatures recorded at Cape Borda have risen by nearly 1.5°C in just the last 50 years.

Global sea level has risen by 19 cm over the period 1901 to 2010, but over the last 15 years the rate of increase has doubled. Sea level rise is driven both by the expansion of seawater as it warms and the melting of icecaps and glaciers. Both Antarctica and Greenland have been losing significant ice mass over recent decades, but as it is closer to the equator, Greenland’s ice is melting twice as fast. Between 2002 and 2011, the average rate of ice loss from the Greenland ice sheet was 215 gigatonnes per year. Sea level rise is not uniform across the globe, being influenced by local factors such as temperatures, ocean currents and weather patterns. The sea level around Kangaroo Island is currently rising by 4-6 mm per year.

The Earth has warmed and cooled in the past.
The Earth’s climate has changed in the past. The sun goes through cycles when it is slightly brighter or dimmer. When the sun is brighter, the planet receives more energy and warms up. When volcanoes erupt, they emit particles into the atmosphere that reflect sunlight and the planet cools down. Likewise, there is natural variability in the level of greenhouse gases such as carbon dioxide (CO$_2$) and methane (CH$_4$) in the atmosphere.

Bureau of Meteorology data show that South Australia as a whole, and Kangaroo Island specifically, has been getting warmer and drier over recent decades.

References:

Please look out for the next exciting insert on ways of mitigating climate change and reducing our ecological footprint.
Over the past 250 years, carbon dioxide levels in the atmosphere have increased by 43%.

The proportion of different forms of carbon (or ‘isotopes’) proves that these additional gases are not from natural emissions but come mainly from burning fossil fuels such as oil and coal. Australia has one of the highest CO₂ emissions rate per capita in the world.

Volcanoes also emit CO₂ but human CO₂ emissions are over 100 times greater than those from volcanoes.

The atmospheric concentrations of carbon dioxide, methane and nitrous oxide substantially exceed the highest concentrations recorded in ice cores during the past 800,000 years. These additional greenhouse gases are causing the planet to warm more than it has in thousands of years. In fact, the Earth’s climate is warming at a rate and into a temperature range never before experienced by humans. In spite of unusually low levels of solar radiation during the 2000s, and especially in 2007-2009, surface temperatures continue to increase.

There is overwhelming scientific consensus about global warming

In September 2013 the Australian Academy of Science issued a statement that ‘the world can be more certain than ever that human-induced climate change is a real and serious threat to our planet.’ On 27 February 2014 the United Kingdom’s Royal Society and the US National Academy of Sciences released a document setting out the clear evidence that humans are causing the climate to change. The overwhelming scientific evidence is accepted by the vast majority of climate scientists and all leading international scientific bodies.

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Future climate forecasts

We can predict how the climate will behave using increasingly sophisticated and powerful mathematical representations of the interactions between the atmosphere, oceans, land surface, ice and the sun. Climate models are statistically tested against historical climate data recorded from a global array of meteorological stations. Whilst there is a high degree of certainty over what is likely to happen in the next few decades, there is less certainty about what may happen in the longer term as it is difficult to predict the behaviour of positive feedback loops. For example, as the permafrost thaws, massive amounts of methane (CH₄), a very much more effective greenhouse gas than CO₂, will be emitted. This means that the models may in fact be too conservative in their projections.

The graph shows the degree of global warming projected to occur depending upon how much action humans take to reduce their greenhouse gas emissions. The black line represents measured historical global mean temperatures while the orange line represents the scenario where greenhouse gas emissions do not increase from today’s levels. The other lines represent projections of future temperatures based upon low, moderate and high rates of growth of future emissions.

The most critical part of this discussion is how we respond to the escalating crisis, both personally and in terms of the action we demand from our political leaders. We can continue to drag our feet and stick our heads in the sand, or we can embrace the challenge and take collective action to transform the way we do things. It is still just possible that the rise in global temperature may be kept below 2°C if there is urgent, widespread, united action to drastically reduce greenhouse gas emissions. It is also possible that by the end of the century, global temperatures could rise by more than 4°C and sea levels by up to 1 m if we continue with ‘business as usual’.