1. **The Earth’s surface changes regularly over time as a result of natural processes and human activity.**
   1. **Desert dunes created by erosion not wind**

<http://www.abc.net.au/science/articles/2012/03/12/3449625.htm>

The above article by Gary (2012) describes how new research has shown that linear sand dunes (long thin dunes that stretch across the landscape), may be erosional in nature rather than wind shaped as previously thought. Scientist say that this might explain why some linear dunes have different internal structures, and no distinct decline in age of sediment. This would also explain why these dunes do not migrate very far (0.02 - 0.04m/annum), when compared to other types of dunes. Professor Wasson states that ‘

Most dunes are formed by wind blowing sand around and accumulation of that sand, but there's been a long standing argument about whether or not some of these dunes can be formed by the erosion of adjacent bodies of sediment such as river or lake deposits, which then just pile up locally and don't migrate very far downwind at all."

Wasson has studied similar linear dunes in the Simpson-Strezelecki and Great Sandy Deserts of Australia and declared that "Some people think these long linear dunes migrate tens or even hundreds of kilometers, but all the evidence suggests they don't migrate very far at all,".

 

This is relevant to point number one, as this research can provide greater insight into how Earth’s deserts (including Australia’s) were formed by natural processes.

* 1. **Mining company to pay for environmental damage. 21st October, 2011** <http://www.environment.gov.au/mediarelease/mining-company-pay-environmental-damage>

The NSW Department of Sustainability, Environment, Water, Population and Communities (DSEWPC) (2011) has ordered a mining company to pay $1.45 million, for damage to a threatened ecological community. An investigation found that mining activities in this area near Lithgow had caused significant impact on the endangered ‘Temperate highland peat swamps on sandstone’ and that the ecosystem had stopped functioning. It is reported that a loss of peat, erosion, vegetation die-back , weed invasion and the formation of a large slump hole has permanently changed the face of this vital ecosystem.

  

 

 

This article is relevant, as mining of all varieties, permanently and detrimentally change the Earth’s surface through human activity. Though this article only states that damage was localized to this area, the waterways and river systems that rely on the filtration of the peat swamps will have far reaching consequences and herald changes to the landscape.

1. **Sudden geological changes or extreme weather can affect the Earth’s surface.**
   1. **Extreme weather – climate change**

<http://www.eoearth.org/view/video/51cbf1cc7896bb431f6a6d0f/?topic=51cbfc7ef702fc2ba812ae95>

Please watch this great clip from the Environmental Protection Authority (EPA).

Climate change is recognized as being the major cause of Earth’s changing weather patterns. The overall increase in temperature is responsible for warming up seas, which makes them expand. Additionally, the polar ice is melting at an unprecedented rate, which is also having a major effect on rising sea levels. The rising sea levels cause erosion of our coastlines and beaches, which is causing major alterations to the Earth’s surface. Scientist estimate that sea levels could rise by another 3ft within the next century.

  

  

* 1. **Earthquakes (sudden geological changes)**

The web address below will take you to the article below and further information.

<http://www.australiangeographic.com.au/topics/science-environment/2012/07/australias-worst-earthquakes/>

**Meckering, Western Australia, 14 October 1968 (Magnitude 6.9)**

Article  
The small town of Meckering, 130km east of Perth, was destroyed by the second strongest onshore earthquake recorded in Australia. Twenty people were injured and 50 buildings damaged, with a cost of $1.5 million (equal to about $57 million today). In Perth buildings swayed for three minutes, and tremors were felt up to 700km from the epicenter. Before the earthquake, Meckering had 51 dwellings, 12 businesses and 15 public buildings. Only 16 houses and three businesses survived. The ground ruptured in a scarp 37km long, and where the fault crossed the highway, the road was split by a step 1.5m high. Railway lines buckled and a water main folded upon itself.

This article highlights how sudden geological changes can affect the Earth’s surface. Earthquakes are caused when tectonic plates mash & grind together. Earthquakes are generally more severe around the areas where these plates meet.

Australia is not usually affected by severe earthquakes, due to the fact that Australia sits in the middle of the Indo-Australian plate. However, the Indo-Australian plate is colliding with the Pacific plate in the east and the Eurasian plate to the north. This causes stresses to build up inside the plate itself. When these forces get big enough they actually break the rock, which causes vibrations in the Earth that we feel as an earthquake. It is known that Australia has an earthquake approximately once a day, though few people may even realize this is happening. About every 5 years, the pent up stresses will cause an earthquake in Australia of a Magnitude 6 or greater. If the quake takes place under a city, especially if shallow, it can cause catastrophic damage.

  

  