



Tweed River Entrance Sand Bypassing Project (TRESBP)

www.tweedsandbypass.nsw.gov.au

Worksheet 3: geographical processes

Worksheet 3, of 4

Required for this worksheet:

- TRESBP Coastal Management Case Study — part 1, Geographical processes (PDF), available online
- Internet access

Physical and human processes

1. Explain the physical geographical processes shaping the coastline at the Tweed River entrance and southern Gold Coast.
2. Outline several ways humans have impacted on the coastline in this area.
3. When were the Tweed River rock training walls first established, then extended? Why were these measures undertaken?
4. Describe the methods used to protect the coast from erosion. Explain how each of these methods has impacted on the coastline.



Tropical cyclone tracks

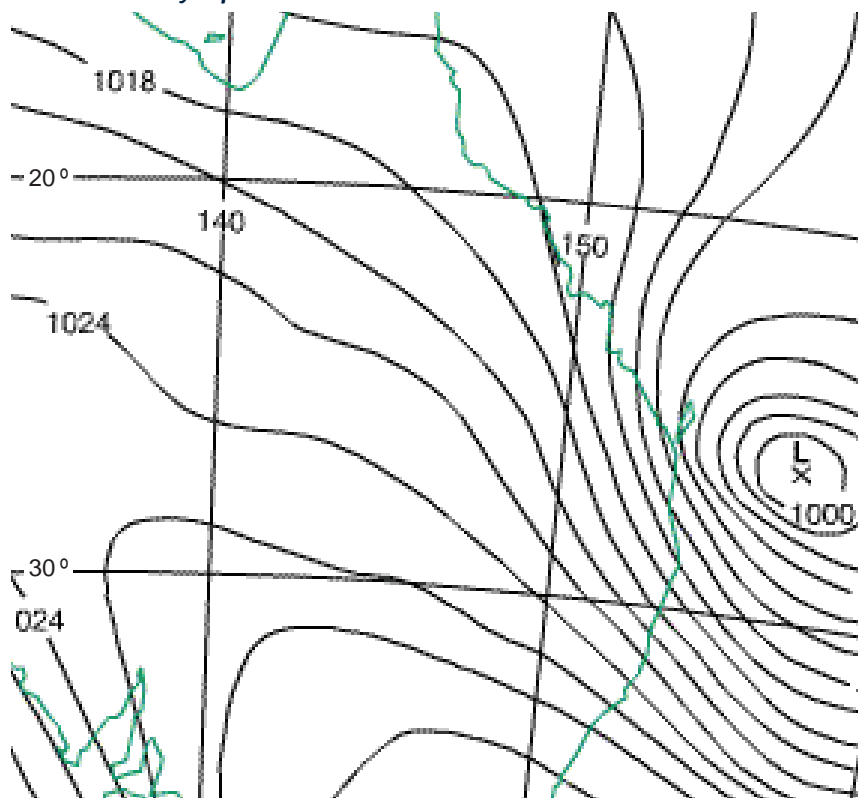
1. Explore the tracks and unpredictable frequency of past cyclones in Australia by finding the Bureau of Meteorology's 'Previous Tropical Cyclones' information, then going to the map 'Tropical cyclones 1906 to June 2007' for the Australian region. Use the map to examine past cyclones and cyclone tracks on the southern Gold Coast:
 - i. select the Australia–East region
 - ii. select the 'Report on a specific location' option
 - iii. enter the years you are investigating
 - iv. find and enter the longitude and latitude coordinates for Coolangatta
 - v. hit 'plot tracks'.
2. Use this approach to investigate cyclones in the following decades: 1950s, 1960s, 1970s, 1980s, 1990s, 2000s. Write a paragraph highlighting the similarities and differences in the number of cyclones in each decade. Why might this be the case?

East coast low storms

Three severe storms battered the coastlines of southern Queensland and northern New South Wales in June 1967. These east coast low storms caused six deaths and extensive beachfront damage at the Gold Coast; huge swells greatly eroded beaches.

1. Mark where Coolangatta/Tweed Heads would be on this 1967 weather map.
2. From which direction were the winds hitting the coast at this location?
3. What was the air pressure at this location, at the time of this weather map?
4. What indicates the intensity of the wind at this location, at the time of this weather map?
5. Give an explanation for why this weather system caused so much damage to the Gold Coast.

Synoptic chart for the storms of late June 1967

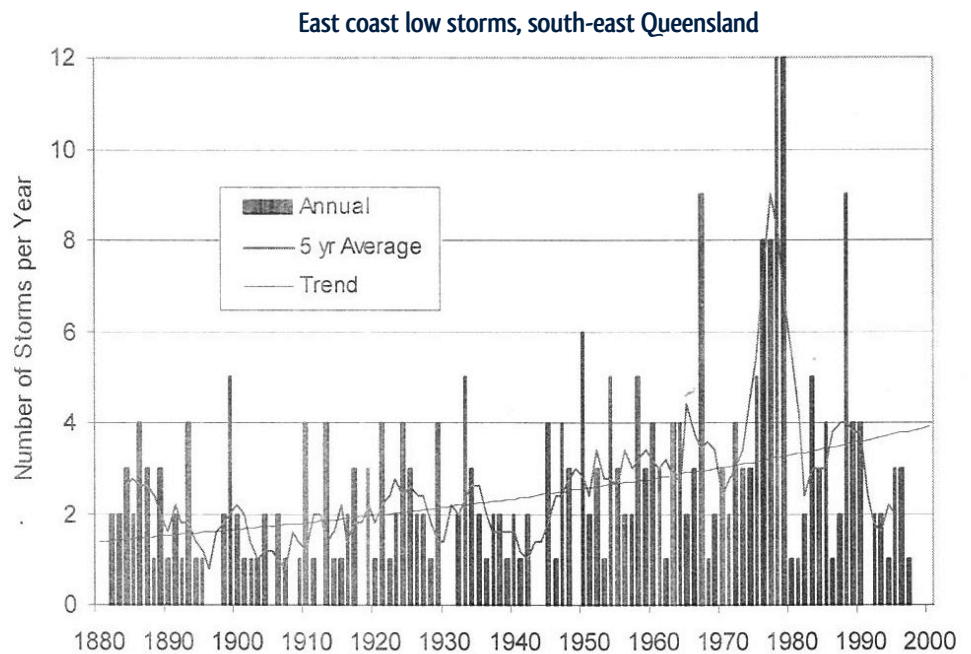



Source: Bureau of Meteorology © Bureau of Meteorology

East coast low storm frequency

ECL storm frequency, like cyclones, is very unpredictable. The Bureau of Meteorology finds there is no evidence of a trend, fewer or greater ECL storm events, in recent decades. About one 'explosive' ECL can be expected somewhere along the east coast each year, from about ten significant ECLs. Examine the graph showing ECL storm frequency in south-east Queensland for more than a century before 1997.

1. Which decades had the least and most storms? In your response, refer to the data provided to support your description.
2. Approximately how many ECLs might have occurred in these 'high' and 'low' decades?
3. Through online research, describe a recent and an historic ECL.



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Comparison of weather systems

Research the following through online sites such as the Australian Bureau of Meteorology and Geoscience Australia or by using other sources.

1. Write a couple of paragraphs summarising tropical cyclones, east coast lows and the main contrasts between the two.
2. List three to five main impacts or dangers to communities and people from these two weather systems. What warnings does the Bureau of Meteorology issue for each of these hazards?

EXTENSION ACTIVITIES

1. Use information from the Bureau of Meteorology, TRESBP and other sources to report on a tropical cyclone and east coast low storm that affected the case study area.
2. Research a tropical cyclone and ECL that affected another part of Australia.
3. A waverider buoy is a floating stainless buoy, painted yellow, which is also a scientific instrument for measuring wave heights. The largest recorded wave in Queensland was during a tropical cyclone in 1993 and measured 13.1 metres. Worldwide, the largest recorded ocean wave which was not a tsunami was in 1933 measuring 33.5 metres. Find the Queensland Government's online Waverider buoy information.
 - a. What are these buoys and how do they work?
 - b. Why is the information important and how is it used?
 - c. Study the 'Wave monitoring' information and table. Present a table (with a heading) showing today's wave height, wave direction and sea surface temperature for waverider buoys at the following locations:
 - Tweed
 - Gold Coast
 - Townsville
 - Cairns.

Write a paragraph summarising and interpreting the table.

4. Try some revision of coastal processes through this website:
www.bbc.co.uk/schools/gcsebitesize/geography/coasts/coastal_processes_rev1.shtml
5. Write a page recounting when, where and how tourism development occurred on the Gold Coast.



Image courtesy of Qld Department of Environment and Resource Management
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