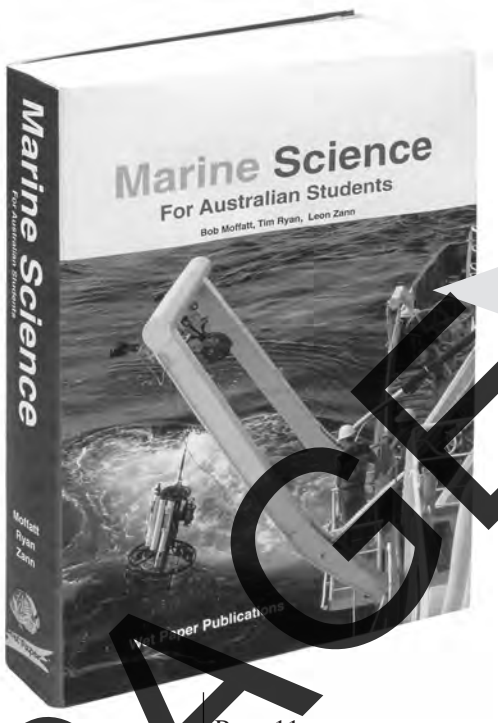
Contents

Read this first

All information to answer the questions is contained in your textbook - *Marine Science for Australian Students* as shown in the Figure below.



- The aim of this enquiry based exercise book is to give you the opportunity to develop your knowledge and understanding of basic oceanography for further study either at university as a marine scientist or at TAFE as an interpretive tourist guide.
- The questions in this book are designed to help you practise answering different levels of literacy question (see page 591 of your textbook). For example harder questions have more challenging verbs such as *interpret*, *distinguish between* and *decide*, whereas easier questions will have verbs such as *name*, *state*, *label*, *list* or *complete*.

  Your teachers can help you interpret and understand these verbs.
- To help get you started, key verbs have been underlined in Exercise A1 - What does the topography of the ocean look like?

Page 11

Answer to Q3. on page opposite

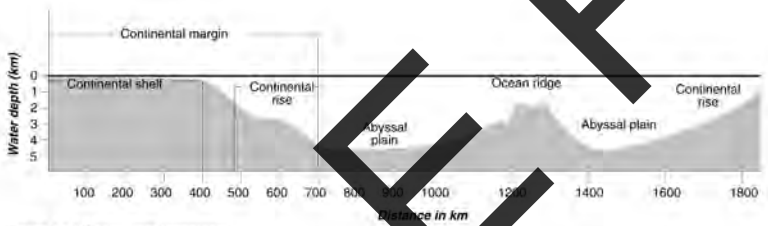


Figure 11.1 Ocean floor topography

Topography

The study of the shape of the land above and below the oceans is called **topography**. The ocean floor is divided into the continental margin, ocean-basin floor and mid-ocean ridges.

Continental margin

The **continental margin** (Figure 11.1) stretches out from the land as far as the eye can see. The average distance for the continental margin is 65 kilometres and its character varies from place to place. In Australia (Figure 11.2), it consists of the **continental shelf** (mostly fairly narrow), the **continental slope**, and the **continental rise**. In other parts of the world the continental margin can consist of a shelf, slope, deep-sea trench and a broad ridge.

Answer to Q4. on page opposite

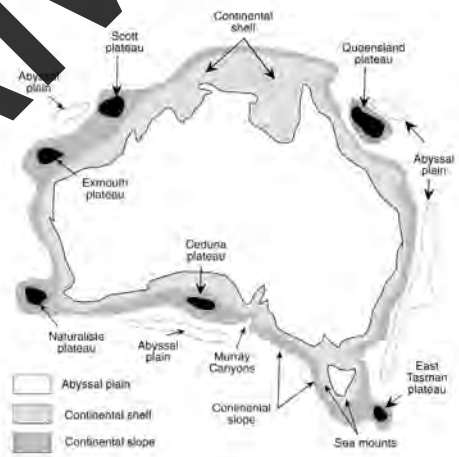


Figure 11.2 Australia's continental shelf

Odd facts

- The earth's tallest mountain, longest mountain range and deepest canyon are all in the ocean.
- The surface of Venus - millions of kilometres away and hidden by clouds of sulphuric acid - has been better mapped than the earth's sea bed (The Economist, 3 September, 1994).
- The Great Meteor seamount (submarine volcano) in the North East Atlantic has a basal diameter of over 100 kilometres and a height of four kilometres (The Times Atlas of the Oceans).
- Australia's very own underwater Grand Canyons - the Murray Canyons are deeper than America's Grand Canyon and more than twice the height of Australia's highest mountain, Mt Kosciusko.

  Scientists drilled long cores into sediment around the Murray Canyons system that has been deposited over the centuries by the Murray Darling river system. This information will hopefully allow scientists to chart the history of oceans and climate in this region every 100 years for the past 250,000 years.

Ocean and coastline formation Page 11

Part A: Oceans

A1. What does the topography of the ocean look like?

Aim

- To explain ocean topography and relate it to Australia.

What to do

- Read pages 7 - 11 of your textbook and answer the questions below.

Questions

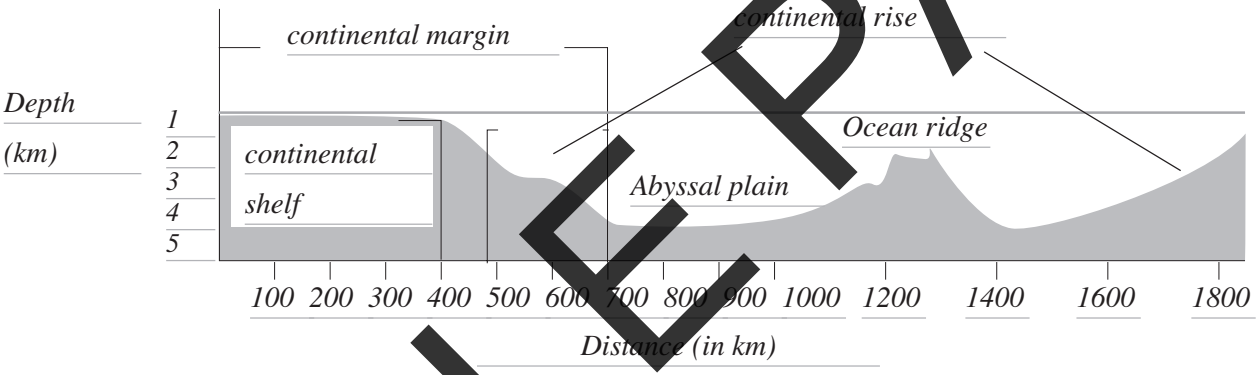
Q1. Describe how the world's oceans formed from the Earth's atmosphere.

As the new atmosphere slowly cooled, it eventually reached a temperature at which water vapour and liquid could exist at the same time. The oceans were then formed.

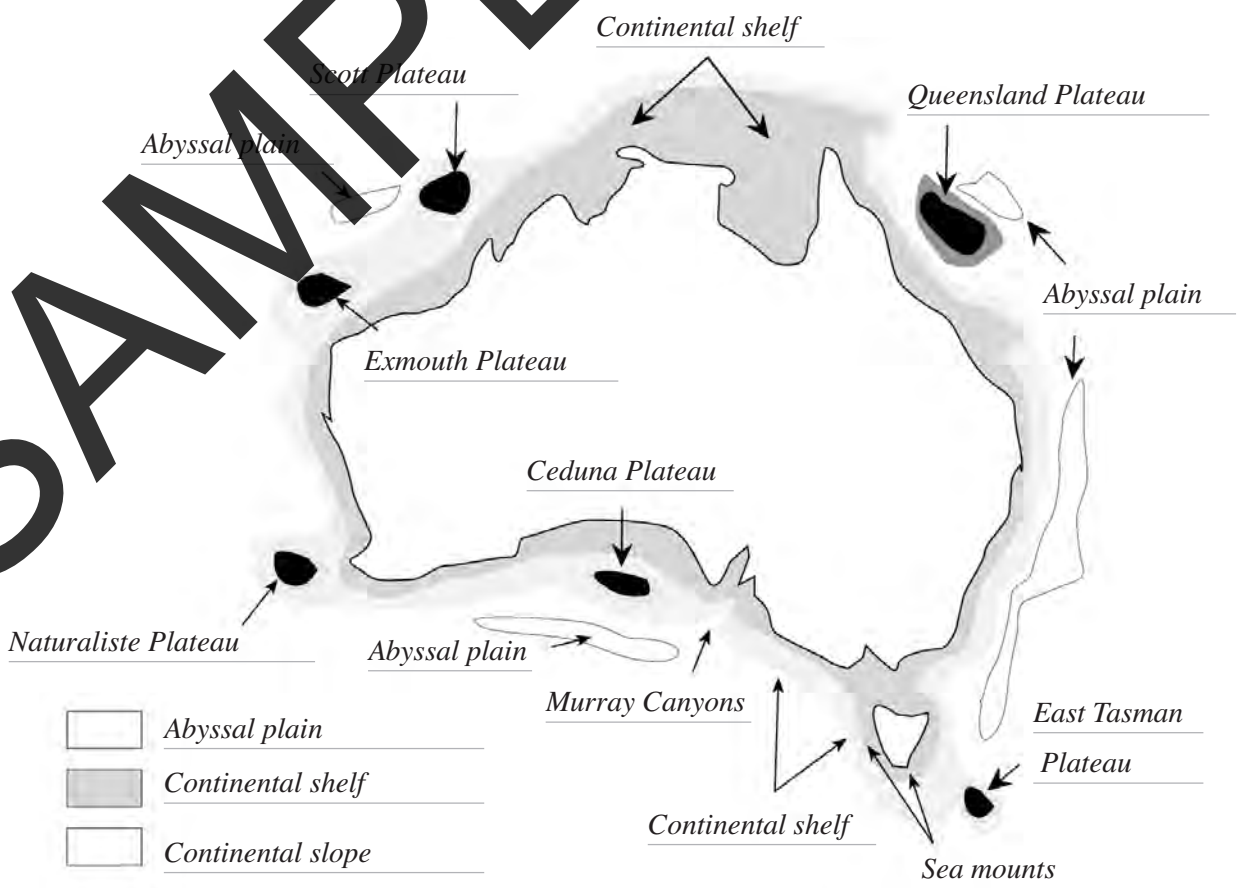
Q2. Recall the mean depth of the ocean. Compare the depth of the Mariana's Trench with the height of Mt. Everest.

The mean depth is 3118 m but the deepest part, the Mariana's Trench in the Pacific Ocean, is 11 038 m deep. This trench dips further below sea level than Mt. Everest reaches above.

Q3. Identify the main features of Figure 11.1 of your textbook by completing the illustration below.



Q4. Complete and colour in the figure below to identify the main features of Australia's continental shelf.



A2. What part of the world oceans does Australia own?

Aim

- To explain the sub surface geology that determines seabed ownership by Australia.

What to do

- Read pages 12 - 13, 22 of your textbook and answer the questions below. Then search for the following URL http://www.ga.gov.au/news/archive/2008/april to answer Question 6.

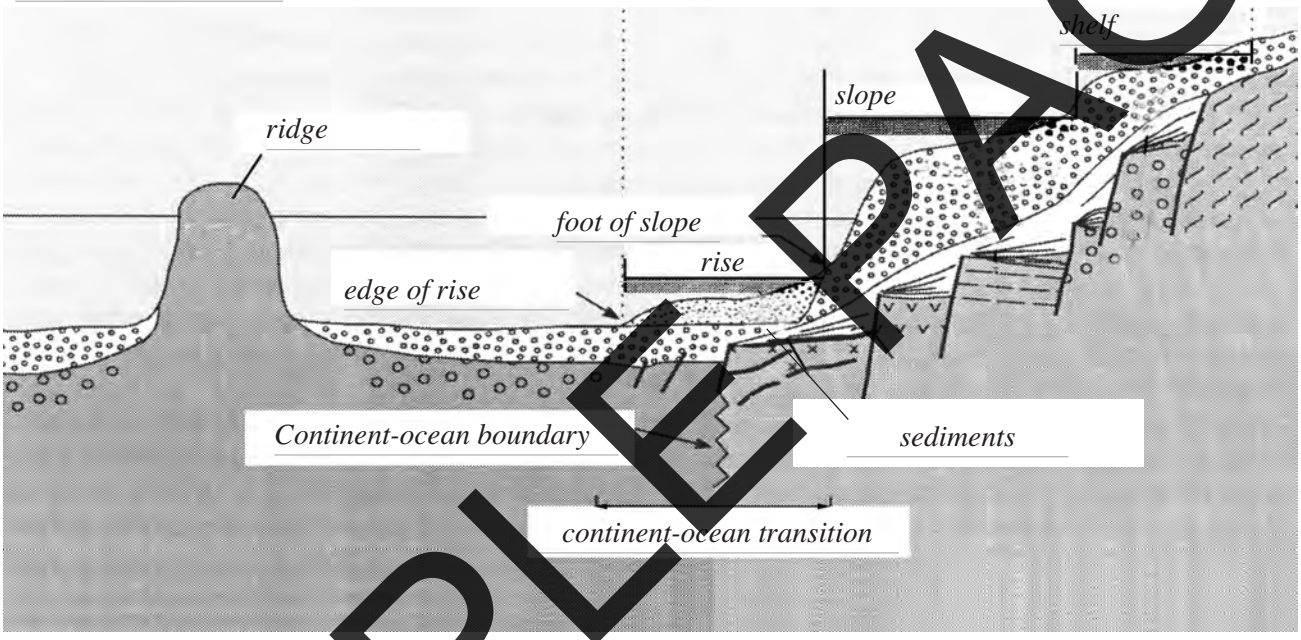
Questions

Q1. Name the parts of the continental shelf that make up the geomorphic margin of Australia.

Rise, slope and shelf

Q2. Complete the diagram below to identify the following - *Sea level, ridge, edge of rise, continent-ocean boundary, continent-ocean transition, foot of slope, rise, slope, sediments and shelf.*

Sea level



Q3. Study page 22 of your textbook. Explain how the sediments in the rise of the geologic margin occurred. Mark these in the diagram above.

Erosion from mountain ranges and valleys caused sediments to flow over the continental shelf.

Q4. Study Figure 13.2 of your textbook and distinguish between the continental shelf and EEZ.

Continental shelf - Sovereign rights for exploring and exploiting non-living resources of sea-bed and subsoil plus sedentary species.

Exclusive economic zone - Sovereign rights for exploring, exploiting, conserving and managing living and non-living resources of the water, sea-bed and sub-soil. Give access to surplus allowable catch.

Q5. Explain how a knowledge of subsurface geology of the continental slope is important to Australia.

It allows us to claim the resources of our continent under the 1982 international Law of the Sea Convention (UNCLOS).

Q6. Use the press release from the Geoscience Australia Web Site below and amend your textbook first edition page 435. http://www.ga.gov.au/news/archive/2008/april. Explain what changed in 2008?

Australia's submission for jurisdiction over an additional 2.5 million square kilometres of seabed was confirmed by the United Nations Commission on the Limits of the Continental Shelf.