

Maps and the GDA

This information sheet explains how the change to Geocentric Datum of Australia (GDA) will affect users of maps and charts.

Background

Maps show coordinates which are based on a mathematical model of the Earth known as a datum. This model defines a mathematical surface that closely represents the shape of the Earth. Over the years, different techniques have been used to represent the curved surface of the Earth, resulting in the adoption of many different datums.

In the past, most mapping within Australia has been based on the Australian Geodetic Datum (AGD). All new mapping will use a new coordinate system known as the Geocentric Datum of Australia 1994 (GDA).

Maritime navigation charts use a variety of datums including AGD, all of which are in the process of being replaced by World Geodetic System 1984 (WGS84) datum charts.

What is GDA?

The GDA is a new coordinate system for Australia which is compatible with the Global Positioning System (GPS), that is, satellite technology used to determine position on the Earth's surface. GDA supersedes the AGD coordinate systems.

What is the difference between GDA and AGD?

GDA is based on an international mathematical model using the centre of mass of the Earth. AGD uses an earlier model that provided the best model for Australia only, and produces coordinates on the Earth's surface some 200 metres different to GDA.

To change a coordinate from one datum to another, a mathematical process known as a transformation is used.

How will GDA change maps and navigational charts?

In line with International treaties, aeronautical and maritime navigation charts have moved, or are moving to WGS84, the datum used by GPS. The change to GDA will not affect users of products based on WGS84. GDA and WGS84 are very closely coincident and can be considered the same for most practical purposes.

The change to GDA will show as a shift in the position of grid lines and a corresponding change in the coordinates of map features (approximately 200m in both Easting/Northing and latitude/longitude).

This apparent change will vary according to the map scale. (Table 1 illustrates the amount of shift within a map, at various scales.) This change will affect a shift in the position of the grid lines on a map as well as the corresponding change in the position of features on the map.

MAP SCALE	GDA MAP SHIFT (mm)
1:5 000	40
1:25 000	8
1:100 000	2
1:250 000	0.8

Table 1: 200 m coordinate shift at various map scales.

The change in the datum is not likely to be noticeable when a map is being used to determine bearings or distances between points. However, if locations are being transferred from an old map or from some other source with a different datum, then a correction must be applied. If not, all points will plot incorrectly. Depending on the use and scale of the map, some errors may be insignificant. It is important to note that heights on a map will not be affected as they will continue to relate to the Australian Height Datum (AHD), which is based on mean sea level.



How do I know it's a GDA Map?

Mapping agencies have agreed to assist users by placing appropriate additional datum information on the maps. All maps will eventually be either updated or redrawn on the new datum, and most map stocks will have warning labels or corrections put on them, so that map users can convert coordinates to GDA.

To determine if a map is on the new datum, look for the GDA logo and datum information in the border information (example 1). Older maps may carry a map warning label, (example 2) to allow the map user to convert from the old datum to the new datum.

IMPORTANT

This map was produced on the Geocentric Datum of Australia 1994 (GDA94). Heights are referenced to the Australia Height Datum (AHD). For most practical purposes GDA94 coordinates and satellite derived (GPS) coordinates based on the World Geodetic Datum 1984 (WGS84) are the same.

Example 1: Datum information on new map.

IMPORTANT

This map was produced on the Australian Geodetic Datum (AGD66/84) which has been superseded by the Geocentric Datum of Australia 1994 (GDA94). Heights are referenced to the Australia Height Datum (AHD).

HORIZONTAL DATUM CONVERSIONS	
To convert	AGD66/84 to GDA94
Latitude	Decrease by x.x seconds (") eg
Longitude	Increase by x.x seconds (") eg
Northing	Increase by xxx metres (") eg
Easting	Increase by xxx metres (") eg

For most practical purposes GDA94 coordinates and satellite derived (GPS) coordinates based on the World Geodetic Datum 1984 (WGS84) are the same.

Example 2: Datum information on old map.

An organisation may publish other documents that also contain this information. Please contact the map producer if there is insufficient information to work out the appropriate conversions.

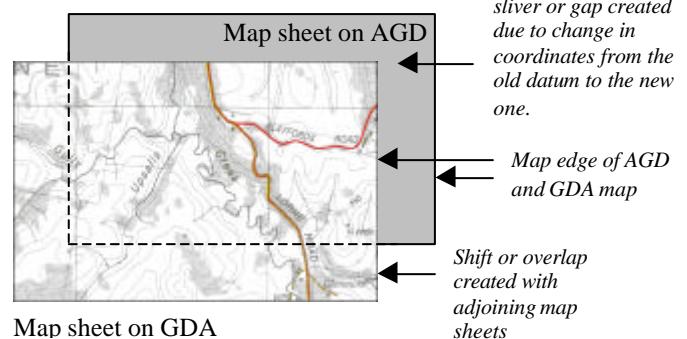
How do I use GDA on my GPS?

Before you use your GPS unit, check what datum it is using. The default datum on GPS is usually WGS84. If your GPS does not support the GDA datum, set your GPS unit to WGS84 (keeping in mind that both GDA and WGS84 can be considered the same for most practical applications).

If you are not sure how to check your GPS unit, your manual will advise you, otherwise seek information from your GPS supplier.

Why do the map edges move?

The graticule which defines the boundaries of a map are whole number values of latitude/longitude or grid coordinates. GDA maps will keep the same numbers on the edge, therefore the map will move about 200 metres towards the south-west and cover a slightly different area.



Users will need to be careful when dealing with a combination of old and new maps, as there may be a gap or an overlap of features on, or near the edge of the adjoining maps.

Practical examples

Question: A four wheel driver records the coordinates of a track at a point in time with his handheld GPS. Later when he plots the coordinates on a topographic map, he notices that the coordinates are 200 metres off the track. What might have caused this problem?

Answer: The handheld GPS unit is probably using the default WGS84 datum and the map that the four wheel driver is using may be on AGD. The four wheel driver must apply a correction to the WGS84 GPS coordinates to bring them onto the AGD datum.

Question: A bushwalker is using a map and a handheld GPS unit. The bushwalker has just determined coordinates of some points from a handheld GPS, which are based on WGS84. The bushwalker is not sure what datum the topographic map is on, and does not want to plot his points until he is sure he is on the right datum. How does he know if the map is on GDA?

Answer: The topographic map should have border information, which will state what datum the map is on. The bushwalker can also look for the GDA logo, or a statement on the map saying that the map is on GDA. If no datum is stated on the map, the bushwalker could compare GPS and map coordinates at known points on the map, or contact the map distributor.

For more information on maps contact your map distributor.

For more information on GDA:

Web: <http://www.anzlic.org.au/icsm/gda/>

Email: icsmgda@auslig.gov.au

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