Geocentric Datum of Australia and Australian Bureau of Statistics Boundaries

What is the Geocentric Datum of Australia?

A datum is a mathematical surface on which a mapping or coordinate system is based. For over a century a variety of datums and coordinate systems have been used within Australia. The first national datum, the Australian Geodetic Datum (AGD66), was adopted in 1966. A revised and updated version of AGD66, based on more precise data, was later adopted in 1984 (AGD84).

In recent years, the increasing importance of satellite positioning systems has meant that there were benefits to Australia in adopting a new datum which was compatible with the geocentric (earth centred) datum used by satellite systems such as the Global Positioning System (GPS). In 1988 the Intergovernmental Committee on Surveying and Mapping (ICSM) decided to adopt a new geocentric datum as the basis for calculating locational coordinates. This new datum, known as the Geocentric Datum of Australia (GDA94), has been adopted progressively from 1994 with a target date of 2000 for general adoption.

The transformation of digital data to GDA94 involves a significant shift, of about 200 metres to the north east, when compared to coordinates based on the older AGD66.

Converting Australian Bureau of Statistics (ABS) boundaries to GDA94

All new digital boundaries first released by the ABS after August, 2001 are based on GDA94.

At the time of transformation of ABS digital boundaries (November 2001) the National AGD66-GDA94 Transformation Grid (A66(National)(13.09.01).gsb) was not available. The transformation of ABS digital boundaries to GDA94 has therefore been carried out using the distortion grids developed by each State and Territory mapping jurisdiction for their own area. (New South Wales and Victoria combined theirs into a single grid (SEA)).

Although the GDA94 datum is compatible with GPS, GPS position fixes may not align precisely with ABS digital boundaries. GPS positions may be spatially less accurate than the boundaries in urban areas, and more accurate than the boundaries in remote areas. Care should therefore be taken when combining features mapped by GPS with ABS digital boundaries.

Using ABS boundaries on GDA94

Users should be aware that older versions of mapping/GIS software may not be able to correctly interpret data based on GDA94. Some software may be able to interpret GDA94 data but may not align it correctly with other data based on earlier datums if the two are mapped together.

Users of MapInfo

In the MapInfo export format files (.mif/.mid files) supplied by the ABS, the datum is specified as 116(GDA94). When these tables are imported into MapInfo, the software converts this to Datum 33 (Geodetic Reference System, 1980 – GRS80). GDA94 is one of a number of datums which are equivalent to GRS80. It is advisable to modify the MapInfo projection file (mapinfo.prj) so that the datum for GDA94 is listed above any other datum based on GRS80. If this is done, the correct datum will be displayed within MapInfo.

Users of versions of MapInfo 6.0 or later are able to load datasets based on GDA94 directly, without transformation. If using datasets based on two different datums, users are advised that loading the GDA94 dataset first will allow the software to adjust the non-GDA dataset to fit, provided it contains information specifying the datum on which it is based. If there is no information stating the datum on which it is based, MapInfo will assume that it is on the same datum as the first dataset. This could cause alignment problems.

Versions of MapInfo earlier than 6.0 cannot interpret GDA94 correctly. There will thus be alignment problems between datasets based on this datum and other earlier datums. For MapInfo users who do not intend to upgrade their software to Version 6.0 or later, it is possible to transform GDA94 data to earlier datums. Users should contact MapInfo Australia for assistance with conversion from GDA94 to earlier datums.

Users of ArcView

Different versions of ArcView handle GDA94 differently. Users should contact their software vendor to ascertain how to transform datasets within ArcView and how best to manage datasets on more than one datum.