Rethinking the Andes–Amazonia Divide
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Introduction to maps and sources

Maps in this book were reproduced by Paul Heggarty from maps provided by chapter authors, by converting them into a GIS (Geographic Information System) database, collated and enriched for South America for the purposes of this book. All data used on the maps are thus geo-referenced – set to actual latitude and longitude coordinates – as precisely as possible. Individual point-locations (such as cities, towns and archaeological sites) are generally exactly pinpointed, by precise known coordinates. Continuous lines or area outlines (‘polygons’) may be more approximate and inferred, especially for historical, archaeological or language distributions.

In all maps, the coordinate reference system used is the common standard EPSG 4326 – WGS 84. All maps follow a standard layout and design, produced in QGIS 3.8 (open source, available from https://qgis.org) using the layers detailed below under ‘Geographical base maps’. The main base geographical data are taken from existing online GIS databases, as identified below. All these base sources are open access, apart from the World Language Mapping System.

Much of the mapping data needed for this book and specific to the archaeology, history, linguistics or ecology of the Andes–Amazonia divide was not available online. Examples include the geographical limits to archaeological horizons in the Andes (Inca, Wari and Tiwanaku); ecological zones, such as the Llanos de Mojos, or the montane forest regions intermediate between the high Andes and Amazonian rainforest; and past distributions of languages now extinct or whose extents are now much reduced. These data have been geo-referenced as points, lines and polygons by Paul Heggarty, using the geo-referencer tool built into QGIS, on the basis of map images provided by the chapter authors. This tool allows original map images to be transformed to the same projection and overlaid as a part-transparent image over the geographical base map, in order to re-draw given geographical features in GIS. The original images supplied by chapter authors were themselves based on various sources, as cited in the caption specific to each map here.

Geographical base maps

The standard layout and design used for all maps in this book is composed of a series of layers of basic geographical data, with respective transparency levels set appropriately to give the best overall result. These base map layers were all sourced from open GIS databases, as follows.
• For ocean bathymetry, and for the underlying base land colour and relief shading, the data source is the worldwide base-map image file, at a scale of 1:10m, provided within the *Natural Earth* package: [NE2_HR_LC_SR_W_DR.tif] at https://github.com/nvkelso/natural-earth-raster/tree/master/10m_rasters/NE2_HR_LC_SR_W_DR

• **Hill-shading** was added using the ‘Shaded Relief Basic’ data file within the *Natural Earth* package: [SR_HR.tif] from https://github.com/nvkelso/natural-earth-raster/tree/master/10m_rasters/SR_HR

• For much **higher-resolution** topography (to approximately 30 m at the Equator), **elevation data** were taken from the SRTM (Shuttle Radar Topography Mission) database, using the six 30 × 30° tiles that cover South America, such as [cut_n00w090.tif], from http://srtm.csi.cgiar.org/srtmdata

• **Elevation bands** were shaded using a **colour ramp** custom designed (by Paul Heggarty) for the elevation profiles of the Andes and Amazonia. See the Elevation band colour ramp values and corresponding colours (p.xxiv). The maps in Figures 2.4.2 and 2.4.3 use a different custom colour ramp, devised specifically to highlight the Huancabamba Depression through the Andes in northern Peru. This colour ramp uses a simple contrast of green up to 2300 m, and white above 2300 m (and the same hill-shading as on all maps).

• The base data files for **bodies of water** were taken from various files within the 1:10m scale *Natural Earth* ‘Quick Start Kit’ package of physical data at https://www.naturalearthdata.com/downloads, namely
  ◦ Coastline: from [ne_10m_coastline.shp]
  ◦ Lakes: from [ne_10m_lakes.shp]
  ◦ Major river lines: from [ne_10m_rivers_lake_centerlines_scale_rank.shp].

• Many maps, especially those zoomed in to sub-regions of the continent, required **additional coverage of smaller rivers**. To this end, customized subsets of river-line data were added as appropriate to each map, from the following sources:
  ◦ For the rivers of the Amazon basin: [reseau1511.shp], [lineaire_1km.shp], [lineaire_4km.shp] and [lineaire_10km.shp] from www.ore-hybam.org/index.php/eng/Data/Cartography/Amazon-basin-hydrography
  ◦ For rivers in Peru: [Rio_navegables.shp] and [Rios_Quebradas.shp] from www.diva-gis.org/Data

Point locations: **Mountain peaks, cities, settlements, archaeological sites**

• The latitude and longitude coordinates of modern cities were taken from the 1:10m scale *Natural Earth* ‘Quick Start Kit’ package of **cultural** data: [ne_10m_populated_places.shp].

• The latitude and longitude and elevation values for some mountain peaks were taken from the 1:10m scale *Natural Earth* package of **physical** data: [ne_10m_geography_regions_elevation_points.shp].
• For smaller towns and settlements in South America, and other peaks and mountain passes, new entries and their latitude and longitude coordinates were added by Paul Heggarty, from online gazetteer resources.
• For archaeological sites (for example, maps in Figures 2.1.1 and 2.4.1), latitude and longitude coordinates were added from online gazetteer resources and published books and articles.

Geographical/environmental

• The Amazon basin watershed line is taken from the HyBAM database: [amazlm_1608.shp] from www.ore-hybam.org/index.php/eng/Data/Cartography/Amazon-basin-hydrography
• Areas of montane forest (for example, Figure 3.7.1) were geo-referenced from a source map provided by Tom D. Dillehay, Brian McCray and Patricia J. Netherly.
• The area of the Llanos de Moxos (such as in Figures 4.4.1 and 4.4.2) was geo-referenced from a source map provided by Umberto Lombardo and José M. Capriles.

Archaeological/historical

• The outline of the Inca Empire at its greatest established extent was geo-referenced from various source maps, principally those in D’Altroy (2015), and especially from larger-scale maps, such as D’Altroy (2015, 328) and Prümers (Chapter 4.2, this volume) that pinpoint known Inca ‘frontier’ fortresses.
• The approximate range of Wari (Middle Horizon) influence was geo-referenced from the source map in Beresford-Jones and Heggarty (2012b).
• The approximate range of Tiwanaku (Middle Horizon) influence was geo-referenced from various source maps, particularly Beresford-Jones and Heggarty (2012b) and Isbell (2004).
• The approximate extent of the Chachapoyas culture in north-western Peru was geo-referenced from a source map provided by Tom D. Dillehay, Brian McCray and Patricia J. Netherly.
• Historical province and audiencia borders in (‘Upper’ and ‘Lower’) Peru were geo-referenced from a source map in Pearce (2001).

Language distributions

Many of the linguistics chapters in this book include maps that illustrate ‘present-day’ distributions of the indigenous languages of South America. In reality, however,
in many regions indigenous languages have been in rapid decline in recent decades, and the areas where they are spoken have continued to shrink. Strictly, then, these ‘present-day’ distributions often more accurately reflect where it is reliably known that given indigenous languages were spoken, at least until recent decades. Almost all published maps of Quechua distributions include Chachapoyas Quechua, for example, but recent fieldwork confirms that there are very few active speakers in the region, and none in the younger generations.

The maps of ‘present/recent’ distributions of language families are based on the following sources.

- The World Language Mapping System (WLMS), from www.worldgeodatasets.com/language (commercial software, not open source, and at the time of publication taken over by www.ethnologue.com and apparently no longer available for purchase).
- Where the WLMS is incomplete or of uncertain reliability, language distributions were reconfirmed, adjusted or added by being geo-referenced from other sources.
- Additionally, for the three main Amazonian language families, language points were geo-referenced on the basis of the three maps in Dixon and Aikhenvald (1999, 66, 126 and 22) of the distribution of languages in the Arawak, Tupí and Carib families respectively.
- Within Peru, language distributions were further refined by geo-referencing from the Atlas Lingüístico del Perú (Chirinos Rivera 2001), particularly for Yanesha and other Arawak languages in the lower eastern slopes of the Andes.

Historical language maps in this book aim to show the distributions of indigenous language families that are either now completely extinct, or much reduced geographically (generally replaced by European languages). These historical databases were geo-referenced on the basis of various historical sources, authored by linguists who have sought to reconstruct these past language distributions as accurately as possible. This is often a difficult task, however, and requires working from limited historical documents in which language identifications may be clear or ambiguous.

- For the Arawak and Carib languages of the Caribbean (Figure 1.2.1), estimated distributions were geo-referenced on the basis of Granberry and Vescelius (2004).
- For languages of the Puquina and Uru lineages in the Altiplano of Bolivia and southernmost Peru, estimated distributions at the end of the sixteenth century (Figures 4.1.1 and 4.2.1) were geo-referenced on the basis of Torero (2002, 465), itself based on reports in Spanish colonial visitas from the sixteenth century.
For the Culle language of central Peru, its estimated distribution in the sixteenth century (Figure 2.5.1) was geo-referenced from a source map supplied by Alexander Herrera, itself drawn up on the basis of Adelaar (1989), Adelaar and Muysken (2004), Cerrón-Palomino (1995) and Torero (1989 and 2002).

Elevation band colour ramp for Andes–Amazonia

![Elevation band colour ramp for Andes–Amazonia](https://example.com/elevation_map.png)

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