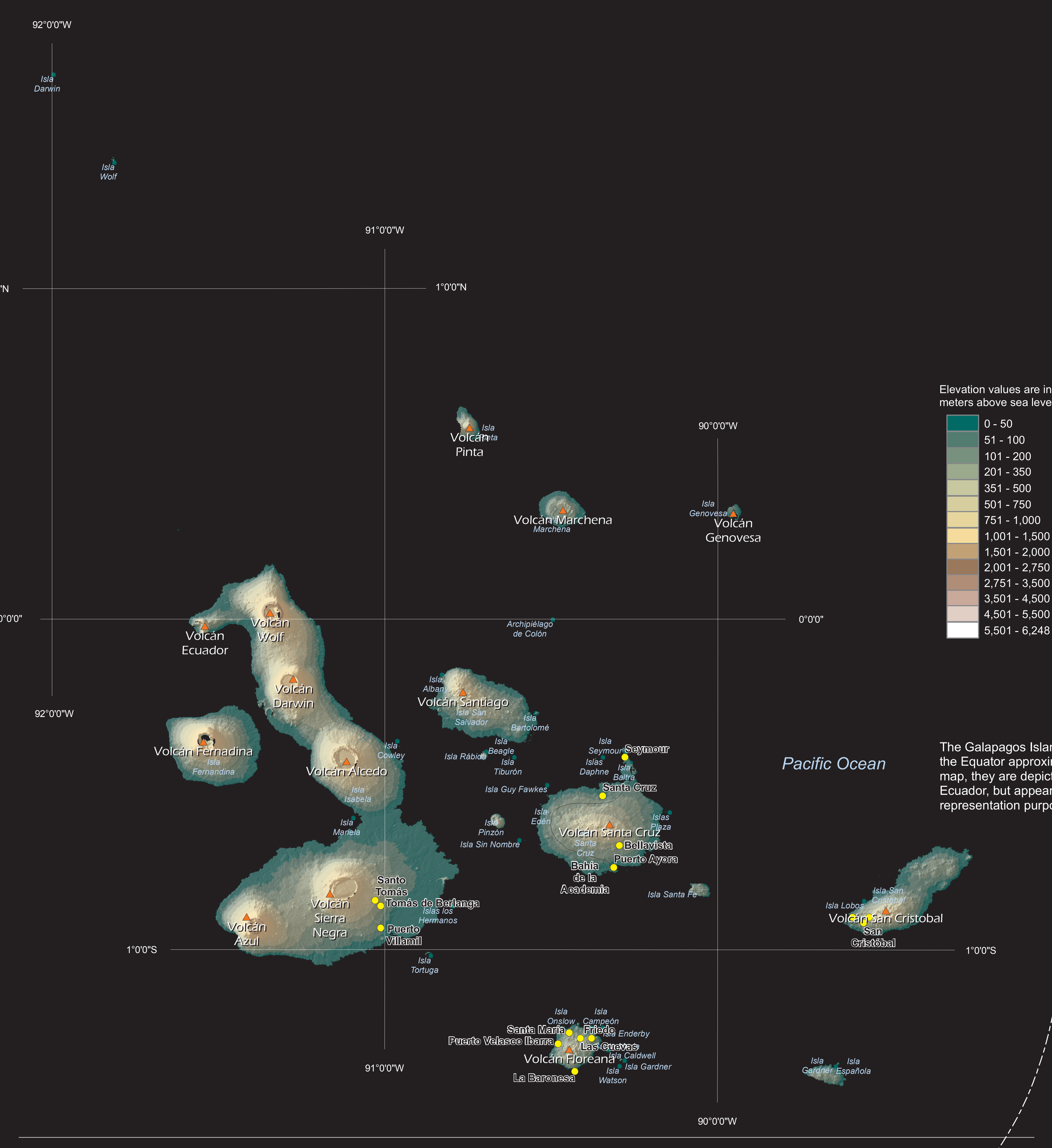
U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

USGS DATA SERIES
DS-136



Explanation

Elevation values are in meters above sea level

- 0 - 50
- 51 - 100
- 101 - 200
- 201 - 350
- 351 - 500
- 501 - 750
- 751 - 1,000
- 1,001 - 1,500
- 1,501 - 2,000
- 2,001 - 2,750
- 2,751 - 3,500
- 3,501 - 4,500
- 4,501 - 5,500
- 5,501 - 6,248

- Volcano
- Large city, small city, or town
- Airport
- Airfield
- Primary and secondary roads
- Railroad
- Intermittent river or stream
- Permanent river or stream
- Lake

The Galapagos Islands, Ecuador's 21st province, are located along the Equator approximately 980 km northwest of Guayaquil. On this map, they are depicted at the same scale and latitude as continental Ecuador, but appear closer, by 8° of longitude, for cartographic representation purposes.

Topography and Landforms of Ecuador

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SCALE 1:1,000,000

0 25 50 100 150 200 Kilometers

Discussion

The digital elevation model of Ecuador represented on this map was produced from over 40 individual tiles of elevation data from the Shuttle Radar Topography Mission (SRTM). Each tile was downloaded, converted from its native Height (.hgt) file format, and imported into a geographic information system (GIS) for additional processing. Processing of the data included data gap filling, mosaicking, and re-projection of the tiles to form one single seamless digital elevation model (DEM).

For 11 days in February of 2000, NASA, the National Geospatial-Intelligence Agency (NGA), the German Aerospace Center (DLR), and the Italian Space Agency (ASI) flew X-band and C-band radar interferometry onboard the Space Shuttle Endeavor. The Endeavor orbited the Earth and collected data between 60ºN and 57ºS and will provide interferometric digital elevation models (DEMs) of approximately 80 percent of the Earth's land mass when processing is complete. The radar-pointing angle was approximately 55º at scene center. Ascending and descending orbital passes generated multiple interferometric data scenes for nearly all areas. Up to eight passes of data were merged to form the final processed SRTM DEMs. Elevation values recorded in coincident scenes are averaged to form a single output data scene and therefore reduces, but does not completely eliminate, the amount of area with layover and terrain shadow effects.

The most significant form of data processing for the Ecuador DEM was gap-filling areas where the SRTM data contained a data void. Void areas result from radar shadow, layover, standing water, and radar interferometry phase unwrapping errors . To fill these gaps, elevation models were acquired from 1:50,000-scale topographic map sources which date from the mid to late 1980s. Digital elevation models for void areas were merged with the SRTM data through GIS and remote sensing image-processing techniques to yield the final SRTM DEM.

Map Projection Information

For Continental Ecuador:
Projection: UTM Zone 17
Datum: Provisional South American, 1956, Ecuador

For the Galapagos Islands:
Projection: UTM Zone 15
Datum: Provisional South American, 1956, Ecuador

Data sources used in the compilation of this map:

Cultural Feature Data

Hearn, P., Hare, T., Schruben, P., Sherrill, D., LaMar, C., and Tsushima, P., 2003, Global GIS database; A Digital atlas of Central and South America, U.S. Geological Survey Digital Data Series DDS-62 A .

Volcanoes

Siebert L, Simkin T (2002-). Volcanoes of the World: an Illustrated Catalog of Holocene volcanoes and their eruptions. Smithsonian Institution, Global Volcanism Program Digital Information Series, GVP-3. (Available online at http://www.volcano.si.edu/world/)

Supplementary Elevation Data

Souris M., 2005, Ecuador DEMs from digitzed topographic maps (1:50,000 and 1:100,000-scale): Paris, IRD, available online at http://rslultra.star.ait.ac.th/~souris/ecuador.htm. (Accessed July 2005.)

Boundaries represented on this map are not necessarily authoritative.

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