The ISO Geodetic Register

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U.S. Geological Survey

Outline
Description of the ISO Geodetic Registry
SIRGAS content in the ISOGR
Planned new content
How to submit new content
What is a register?

• Registers & registries
  • Register – a structured database of information with unique identifiers
  • Registry – implementation of the structured database (e.g., spreadsheet, web app)

• The need for geodetic registers
  • To unambiguously identify the different coordinate reference systems and transformations used to manage geospatial data – primarily in GIS software
  • To foster interoperability of geodetic data and products
  • To support the implementation of the UN-GGIM Global Geodetic Reference Frame
  • GGRF Implementation Plan recommends that Member States enter their reference system information into the ISO Geodetic Register
The ISO Geodetic Register (ISOGR)

• Provided by the ISO Technical Committee on geographic information/ geomatics (ISO/TC 211) – released Dec 2018
• Conforms to ISO standards (next slide)
• Main purpose is to serve as the authoritative source for reference frames and transformations
  • Information in the ISO Geodetic Register has been either directly entered or approved by the agencies responsible for defining & maintaining the reference systems and transformations
  • All information is reviewed and approved by a “Control Body” of geodetic experts chaired by representatives of the IAG (current chair: Dr Michael Craymer)
• Also serves as an authoritative source for other registers (e.g., EPSG)
  • Not meant to complete with other registries but complement them
The ISO Geodetic Register (ISOGR)

• Follows ISO standards
  • Primary Standards
    • ISO 19127 – ISO Geodetic Register
    • ISO 19135 – Procedures for item registration
    • ISO 19111 – Referencing by coordinates
  • Other ISO standards used for
    • Date, time and coordinate formats
    • Geography Markup Language (GML) output
    • Well Known Text representation output
    • Many others
ISO 19127 & 19135

- Defines the procedures for preparing, managing & maintaining the ISOGR

**Types of submissions (proposals)**
- Addition of new data
- Clarification/correction of existing data
- Supersession (updating) of existing data
- Retirement of existing data (no longer used but retained for historical purposes)
- Invalidation of existing erroneous data

**Proposal Approval Process**

1. Submit Proposal
2. Register Manager reviews proposal for completeness
3. Accept Proposal
4. Control Body reviews proposal for correctness
5. Approve Proposal
6. Add to Register
7. Reject Proposal
8. Reject Proposal
ISO 19111

• Defines the elements that describe
  • Datums (reference frames)
  • Coordinate systems (Cartesian, ellipsoidal, heights, map projections)
  • Coordinate Reference Systems (CRS)
  • Coordinate operations (conversions & transformations)
  • CRS & operation identifiers primarily used in GIS software

• Current ISOGR Registry follows 19111:2007
  • Static datums only
  • Does not explicitly support geoid-based datums

• New ISOGR Registry being developed for 19111:2019
  • Dynamic datums
  • Epoch propagation (point motion operations)
  • Geoid-based datums
  • Migrating to a more efficient open-source platform

Standardization in the field of digital geographic information.
ISO Geodetic Registry (ISOGRR)

The ISO Geodetic Registry is a structured database of coordinate reference systems (CRS) and transformations that is accessible through this online registry system. The Register includes only systems and transformations of international application. It does not include all possible coordinate reference systems and transformations.

This Registry is provided under the auspices of ISO Technical Committee 211 on geographic information/geomatics and conforms to the following ISO standards:

- ISO 19111:2007 (Spatial referencing by coordinates)
- ISO 19127:2019 (Geodetic register)

Work is also underway to upgrade the Registry to conform to the recently revised ISO 19111:2019 standard, which includes support for dynamic datums and geoid-based datums.

July 2022: ISO/TC 211, OGC and IOGP have jointly published the "Guide to Coordinate Reference System (CRS) Resources". The guide describes basic information and the intended purposes of the three authoritative CRS registers: EPSG, ISO Geodetic and OGC CRS registries, for the user community.

Usage and license

The Registry may be used free of charge but its use is subject to acceptance of the Terms of Use. Use of the Registry implies acceptance of these Terms of Use.

Users of the Registry may query and generate reports via anonymous guest access. Only approved authoritative agencies may submit proposals for new additions or clarifications to the Registry. Authoritative agencies may request to register for submissions using the Feedback page.

Registration Authority

Ribose was appointed as Registration Authority of the ISO Geodetic Register by ISO in 2019 in accordance to ISO/TC31 resolution 4/2019 and ISO/TC 211 Resolution 912. As Registration Authority, Ribose is responsible for providing registration services for the ISO Geodetic Register following the ISO 19127 International Standard.

Contacting us

If you encounter issues or have any questions about the ISO Geodetic Register, please use the Feedback page to submit them. A member of the team will reach out to you directly.

Sponsors

The ISO Geodetic Register is made available to the public free of charge with financial support provided by the following sponsors:

- Ribose
- Kartverket
- Natural Resources Canada
- Ressources naturelles Canada
- IGN
- Institut National de l'Information Géographique et Forestière

Last updated: 2022-08-29T13:35Z -2o02a3
ISOGR Usage

About 8,000 users since 2019
About 10,000 pageviews every year

<table>
<thead>
<tr>
<th>Users</th>
<th>Returning</th>
<th>Pageviews</th>
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<tr>
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<td>681</td>
<td>7,104</td>
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<tr>
<td>Dec-May 2020</td>
<td>733</td>
<td>5,520</td>
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<td>Jun-Nov 2021</td>
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<td>Dec-May 2022</td>
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<td>Jun-Oct 2022</td>
<td>833</td>
<td>3,774</td>
</tr>
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</table>

Users    Returning    Pageviews
Jun-Nov 2019    681    37%    7,104
Dec-May 2020    733    33%    5,520
Jun-Nov 2020    964    38%    11,826
Dec-May 2021    2,237   36%    9,228
Jun-Nov 2021    1,412   22%    4,990
Dec-May 2022    1,659   17%    4,621
Jun-Oct 2022    833    25%    3,774

Last 5 months

- Jun-Nov 2019: 681 users, 37% returning, 7,104 pageviews
- Dec-May 2020: 733 users, 33% returning, 5,520 pageviews
- Jun-Nov 2020: 964 users, 38% returning, 11,826 pageviews
- Dec-May 2021: 2,237 users, 36% returning, 9,228 pageviews
- Jun-Nov 2021: 1,412 users, 22% returning, 4,990 pageviews
- Dec-May 2022: 1,659 users, 17% returning, 4,621 pageviews
- Jun-Oct 2022: 833 users, 25% returning, 3,774 pageviews

About 8,000 users since 2019
About 10,000 pageviews every year

2022/11/09
SIRGAS Content

- List of SIRGAS datums (2) & CRSs (6)
- Example of information for the SIRGAS2000 CRS
- List of SIRGAS-CON datums (16)
- Example of information for the SIR17P01 datum
- List of SIRGAS transformations (18)
### Geodetic Datum

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### Geodetic CRS

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Geodetic CRS

Name  Identifier
SIRGAS2000 - LatLonEHt  313

Alias
Geocentric Reference System for South America
Geocentric Reference System for the Americas
SIRGAS 2000
SIRGAS2000
Sistema de Referencia Geocentrico para las Americas
South American Geocentric Reference System 2000

Extent
South America - onshore and offshore. Central America - onshore and offshore. Mexico - onshore and offshore.

Datum
Sistema de Referencia Geocentrico para America del Sur 2000

Coordinate System

Base CRS
[undefined]

Operation
[undefined]

Information Source
1. Results of the SIRGAS campaign 2000 and coordinates variations with respect to the 1995 South American geocentric reference frame
2. Deformation of the South American crust estimated from finite element and collocation methods
3. Sistema de Referencia Geocentrico para las Americas (SIRGAS)
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<thead>
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</table>
Geodetic Datum

Name  Identifier
SIRGAS Continuously Operating Network  129
SIR17P01

Alias
- Geocentric Reference System for the Americas
- SIR17P01
- SIRGAS
- SIRGAS Multi-Year Solution 2017
- SIRGAS-CON
- Sistema de Referencia Geocentrico para las Americas

Scope
Spatial referencing

Anchor Definition
Realized by a frame of 345 continuously operating stations using GPS and GLONASS observations from April 2011 to January 2017 and aligned to IGS14 at epoch 2015.0. This cumulative solution has been made consistent with the phase centre calibrations referring to the IGS14 reference frame using the latitude-dependent phase centre correction model by the International GNSS Service. Velocity model VEMOS2017 used to propagate coordinates from an arbitrary epoch to the 2015.0 reference epoch.

Extent
South America - onshore and offshore. Central America - onshore and offshore. Mexico - onshore and offshore.

Ellipsoid
GRS 1980

Prime Meridian
Greenwich

Release Date
2018

Coordinate Reference Epoch
2015.0

Remarks
Replaces SIR15P01.

Information Source
1. Velocity model for SIRGAS 2017: VEMOS2017
2. Kinematics of the SIRGAS reference frame
3. Sistema de Referencia Geocentrico para las Americas (SIRGAS)
4. The varying surface kinematics in Latin America: VEMOS 2009, 2015, and 2017
5. SIRGAS reference frame realization SIR17P01
### 18 SIRGAS “Null” Transformations
(SIRGAS is aligned to ITRF/IGS)

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Planned New Content

• Over a thousand map projections for existing content
• Reference frames used by GNSS systems
  ✓ WGS 84 – GPS (done)
  • PZ-90 – GLONASS
  • GTRF – Galileo
  • CTRF 2000 – BeiDou
  • JGS2010 – QZSS
• National ETRS89 realizations
  • EUREF requesting their members to add their national realizations to the ISOGR
  • Swedish SWEREF99 in progress – dynamic datum
• National SIRGAS realizations
  • Columbian MAGNA-SIRGAS 2018 in progress – see next slide
  • Encourage all SIRGAS members to add their national SIRGAS realizations in support of the GGRF
Standardization in the field of digital geographic information.
More Information

• Public access to ISOGR (no registration required)
  https://geodetic.isotc211.org

• Submitting proposals
  Submit request via Feedback option on home page (top-right)
  Or email: michael.craymer@nrcan-rncan.gc.ca