Online, Interactive Assessment of Geothermal Energy Potential in the U.S.A.*

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Abstract

Geothermal-relevant geosciences data from all 50 states (www.stategeothermaldata.org), federal agencies, national labs, and academic centers are being digitized and linked in a distributed network via the U.S. Department of Energy-funded National Geothermal Data System (NGDS) to foster geothermal energy exploration and development through use of interactive online ‘mashups,’ data integration, and applications. Emphasis is first to make as much information as possible accessible, with a long range goal to make data interoperable through standardized services and interchange formats.

An initial set of thirty geoscience data content models are in use or under development to define standardized interchange format: aqueous chemistry, borehole temperature data, direct use feature, drill stem test, earthquake hypocenter, fault feature, geologic contact feature, geologic unit feature, thermal/hot spring description, metadata, quaternary fault, volcanic vent description, well header feature, borehole lithology log, crustal stress, gravity, heat flow/temperature gradient, permeability, and feature description data like developed geothermal systems, geologic unit geothermal properties, permeability, production data, rock alteration description, rock chemistry, and thermal conductivity.

Map services are also being developed for isopach maps, aquifer temperature maps, and several states are working on geothermal resource overview maps. Content models are developed preferentially from existing community use in order to encourage widespread adoption and promulgate minimum metadata quality standards. Geoscience data and maps from NGDS participating institutions (USGS, Southern Methodist University, Boise State University Geothermal Data Coalition) are being supplemented with extensive land management and land use resources from the Western Regional Partnership (15 federal agencies and 5 Western states) to provide access to a comprehensive, holistic set of data critical to geothermal energy.
development. As of September 2011, we have over 34,000 records registered in the system catalog, and 234,942 data resources online, along with scores of Web services to deliver integrated data to the desktop for free downloading or online use. The data exchange mechanism is built on the U.S. Geoscience Information Network (USGIN, http://lab.usgin.org) protocols and standards developed as a partnership of the Association of American State Geologists and U.S. Geological Survey.
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www.stategeothermaldata.org


Arizona Geological Survey
NGDS: The Challenge of Data

Selected data resources in State Geological Surveys

- 3.5 million wells – oil & gas, water
- 195,000 well logs
- 50,000 geothermal wells
- 750,000 BHT’s
- 6 Tb existing digital data
- >75,000 scanned publications & maps
- 2.5 million feet of core
- 600,000 sample logs

1,000s of databases
1,000s of collections
80,000+ geologic maps
USGIN: data integration framework

- **Distributed**
- **Web-based**
- **Interoperable**
- **Open source**
- **Community of Practice**

**Separation of roles:**
- **Data Producer**
  - Manage data content
- **Data Provider**
  - Server performance
  - Archive and backup
  - Service implementation, schema mapping
- **Data Consumer**
  - Find resources
  - Extract useful information
  - User interface
Geothermal Data System

- Discover via the Catalog
- Access via the Web
- Explore using Applications
Catalog search – Borehole Temperatures
Borehole Temperature search results

www.stategeothermaldata.org
Zoom to and add to map – KY BHTs
Zoom to and add to map – CA BHTs
Exploring the Data in our Application – Well Headers in Nevada using ArcGIS

NV well headers within 200m of a transmission line
Individual features in live datasets may be queried for attributes
Data sets from states

30+ data types in 8 categories
Coming to your desktop ....a U.S. geothermal data system