



## **Spatial Digital Database for the Geologic Map of Oregon**

Geology compiled by George W. Walker and Norman S. MacLeod  
Spatial database by Robert J. Miller, Gary L. Raines, and Katherine A. Connors<sup>1</sup>

Open File Report 03-67  
Digital database, version 2.0

2002  
(map originally published in 1991)

Database approved for February 20, 2003

This report is preliminary and has not been reviewed for conformity with U.S. Geological Survey editorial standards or with the North American Stratigraphic Code. Any use of trade, product, or firm names is for descriptive purposes only and does not imply endorsement by the U.S. Government. The digital database is not meant to be used or displayed at any scale larger than 1:500,000.

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

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## **Introduction**

This report describes and makes available a geologic digital spatial database (*orgeo*) representing the geologic map of Oregon (Walker and MacLeod, 1991). The original paper publication was printed as a single map sheet at a scale of 1:500,000, accompanied by a second sheet containing map unit descriptions and ancillary data. A digital version of the Walker and MacLeod (1991) map was included in Raines and others (1996).

The dataset provided by this open-file report supersedes the earlier published digital version (Raines and others, 1996). This digital spatial database is one of many being created by the U.S. Geological Survey as an ongoing effort to provide geologic information for use in spatial analysis in a geographic information system (GIS). This database can be queried in many ways to produce a variety of geologic maps. This database is not meant to be used or displayed at any scale larger than 1:500,000 (for example, 1:100,000).

This report describes the methods used to convert the geologic map data into a digital format, describes the ArcInfo GIS file structures and relationships, and explains how to download the digital files from the U.S. Geological Survey public access World Wide Web site on the Internet. Scanned images of the printed map (Walker and MacLeod, 1991), their correlation of map units, and their explanation of map symbols are also available for download.

## **Data Sources, Processing, and Acknowledgements**

A digital version of Walker and MacLeod's geologic map of Oregon was first published by Raines and others (1996) as a mechanism to archive a collection of files that had evolved over time. Negatives for the printed map sheet were originally prepared on a Scitex computer system. The Scitex formatted files were later converted to an ArcInfo format by personnel of the National Mapping Division of the U.S. Geological Survey. These files contained map unit labels but did not contain attributed linework. Faults were later digitized into a separate file and attributed by a contractor to the USGS.

With this release of a second digital dataset, several enhancements have been made. Faults, previously provided in a separate spatial database, were combined with the geologic contacts and map units spatial database. A rubbersheeting process was employed to improve the fit of the original dataset to topographic and other base layers. In addition, the dataset was adjusted and cropped to conform to an Oregon state boundary derived from 1:100,000 scale Digital Line Graph (DLG) files. This was done as part an effort to produce a mosaic of state geologic map databases for the entire United States.

Processing by the U.S. Geological Survey was first done on a Scitex system. Subsequent processing was done in ArcInfo (in versions 5 thru 7 installed on Sun and in version 8 installed on Dell workstations).

Manuscript and digital data review by Helen Z. Kayser (contractor) is greatly appreciated.

## GIS Documentation

The digital geologic map of Oregon consists of a single spatial database (*orgeo*) which contains map units and lines. The feature attribute tables include a geologic linework table, ORGEO.AAT, that relates to the ORGEO.CON, ORGEO.ST2 and ORGEO.REF files, and rock unit table, ORGEO.PAT, that relates to the ORGEO.RU and ORGEO.REF files (see [fig. 1.](#)) These data files are described below.

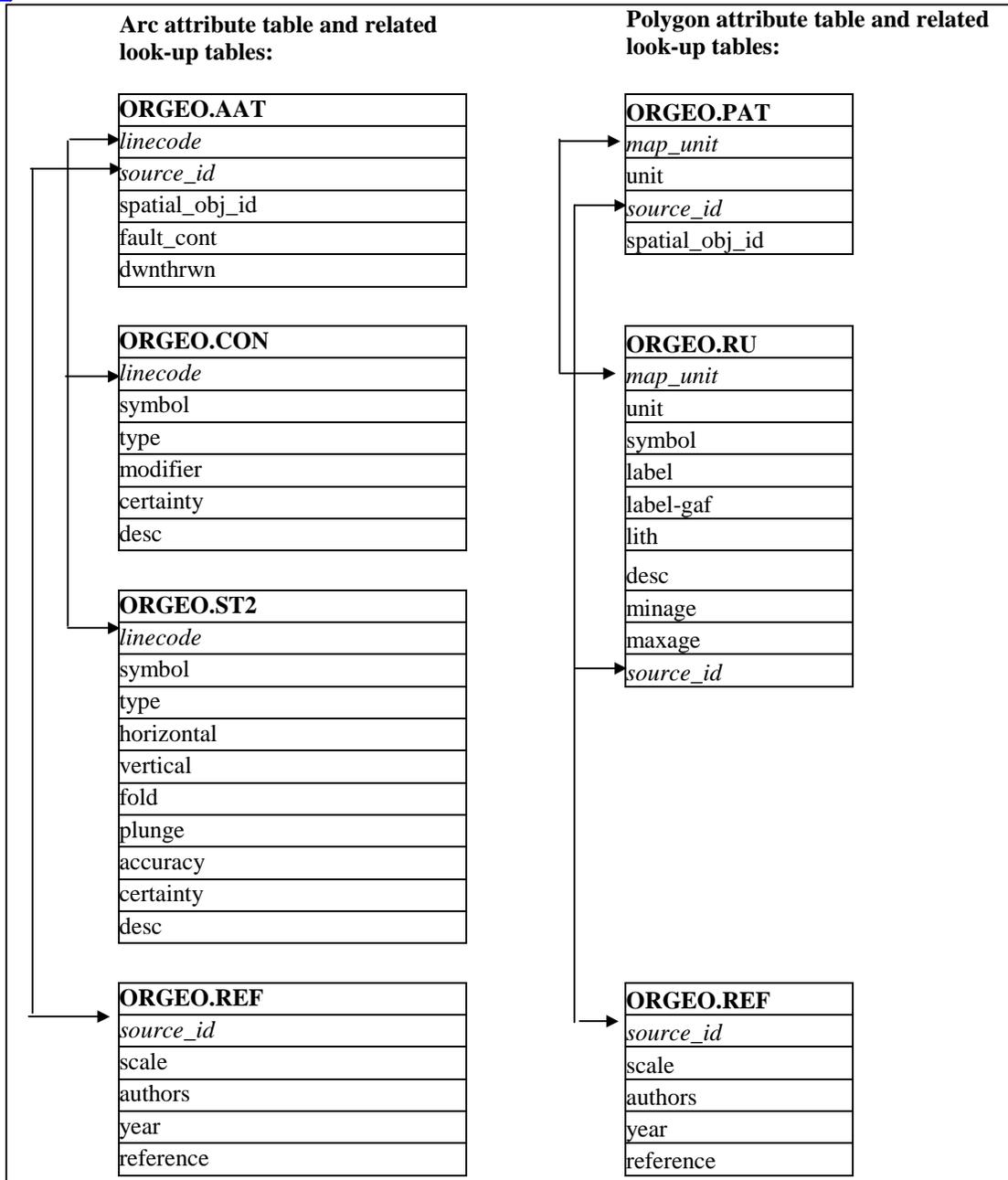


Figure 1: Relationships between feature attribute tables and look-up tables.

## Linear Features

Descriptions of the items identifying linear features such as contacts, boundaries (for example, lines of latitude and longitude, state boundaries) and structures in the arc (or line) attribute table, **ORGEO.AAT**, are as follows:

<b>ORGEO.AAT</b>			
ITEM NAME	ITEM TYPE	ITEM LENGTH	ATTRIBUTE DESCRIPTION
linecode	integer	3	Numeric code used to identify type of linear feature. Linecodes < 100 are used for contacts and boundaries which are described in the ORGEO.CON file. Linecodes > 100 and < 600 represent structural features which are described in the ORGEO.ST2 file.
source_id	integer	4	Numeric code used to identify the data source for the linear feature. Complete references for the sources are listed in the ORGEO.REF file.
spatial_obj_id	integer	12	Unique numeric identifier for each object in the <i>orgeo</i> feature attribute tables ( <i>orgeo.aat</i> and <i>orgeo.pat</i> ). (This numeric identifier is NOT duplicated in the <i>orgeo.pat</i> feature attribute table.)
fault_cont	character	4	Indicates whether fault constitutes a contact between rock units
dwnthrwn	character	5	Indicates the sense of movement on the fault. The side indicated by the compass direction is downdropped.

Attribute descriptions for items in the contact (and boundary) lookup-table, **ORGEO.CON** are as follows:

<b>ORGEO.CON</b>			
ITEM NAME	ITEM TYPE	ITEM LENGTH	ATTRIBUTE DESCRIPTION
linecode	integer	3	Numeric code (a value < 100) used to identify type of contact or boundary. (This item also occurs in ORGEO.AAT.)
symbol	integer	3	Line symbol number used by ArcInfo to plot lines. Symbol numbers refer to the WP.LIN lineset
type	character	10	Major type of line, for example, contact, state boundaries, lines of latitude and longitude used for neatlines.
modifier	character	20	Line type modifier, for example, approximate, concealed, gradational. No entry implies 'known.'
certainty	character	15	Degree of certainty of contact or boundary, for example, inferred, uncertain. No entry implies 'certain'
desc	character	100	Written description or explanation of contact / boundary.

Attribute descriptions for items in the structure look-up table, **ORGEO.ST2**, are as follows:

<b>ORGEO.ST2</b>			
ITEM NAME	ITEM TYPE	ITEM LENGTH	ATTRIBUTE DESCRIPTION
linecode	integer	3	Numeric code (a value > 100 and < 600) used to identify type of structural feature. (This item also occurs in ORGEO.AAT.)
symbol	integer	3	Line symbol number used by ArcInfo to plot arc (line). Symbol numbers refer to the GEOL_SFO.LIN lineset.
type	character	10	Major type of structure, for example, fault, fracture, fold, other.
fold	character	15	Type of fold, for example, anticline, syncline.
plunge	character	15	Type of plunge on fold, for example, horizontal, plunging, plunging in, plunging out.
accuracy	character	15	Line type modifier indicating degree of accuracy, for example, approximately located, concealed, gradational. No entry implies 'known'
certainty	character	15	Degree of certainty of contact or boundary, for example, inferred, uncertain. No entry implies 'certain.'
desc	character	100	Written description or explanation of structural feature.

### **Areal Features**

Descriptions of the items identifying geologic units in the polygon attribute table, **ORGEO.PAT** are as follows:

<b>ORGEO.PAT</b>			
ITEM NAME	ITEM TYPE	ITEM LENGTH	ATTRIBUTE DESCRIPTION
map_unit	character	10	Rock unit label. Map unit is described in the ORGEO.RU look-up table. (This item also occurs in ORGEO.RU.)
unit	integer	4	Numeric code used to identify rock unit. (This item also occurs in ORGEO.RU.)
source_id	integer	4	Numeric code used to identify the data source for the rock unit. Complete references for the sources are listed in the ORGEO.REF file.
spatial_obj_id	integer	12	Unique numeric identifier for each object in the <i>orgeo</i> feature attribute tables ( <i>orgeo.aat</i> and <i>orgeo.pat</i> ). (This numeric identifier is NOT duplicated in the <i>orgeo.aat</i> feature attribute table.)

Attribute descriptions for items in the lithology (rock unit) look-up table, **ORGEO.RU** are as follows:

<b>ORGEO.RU</b>			
ITEM NAME	ITEM TYPE	ITEM LENGTH	ATTRIBUTE DESCRIPTION
map_unit	character	10	Alphanumeric code used to identify rock unit. (This item also occurs in ORGEO.PAT.)
unit	integer	4	Numeric code used to identify rock unit. (This item also occurs in ORGEO.PAT.)
label	character	10	Rock unit label (abbreviation) for use with standard alphabetic characters.
label-gaf	character	10	Rock unit label (abbreviation) that uses the GeoAgeFullAlpha font, ver. 1.1 (Richard Koch, personal commun., 2001).
lith	character	50	Major type of lithostratigraphic unit, for example, unconsolidated sediments, sedimentary rocks, metasedimentary rocks, intrusive rocks, extrusive rocks, metamorphic rocks, water, ice.
desc	character	250	Formal or informal unit name
minage	character	7	Minimum stratigraphic age of lithologic unit, for example, CRET, TERT, M PROT.
maxage	character	7	Maximum stratigraphic age of lithologic unit

### Source Attributes

Descriptive source or reference information is stored in the **ORGEO.REF** look-up table. Attribute descriptions for items in the **ORGEO.REF** file is as follows:

<b>ORGEO.REF</b>			
ITEM NAME	ITEM TYPE	ITEM LENGTH	ATTRIBUTE DESCRIPTION
source_id	integer	4	Numeric code used to identify the data source. (This item also occurs in the ORGEO.AAT, and ORGEO.PAT files.)
scale	integer	8	Scale of source map. (This value is the denominator of the proportional fraction that identifies the scale of the map that was digitized or scanned to produce the digital map.)
authors	character	200	Author(s) or compiler(s) of source map entered as last name, first name or initial, and middle initial.
year	integer	4	Source (map) publication date
reference	character	250	Remainder of reference in USGS reference format.

## Obtaining Digital Data

The complete digital version of the geologic map is available in Arc Info interchange format with associated data files. These data are maintained in a Lambert coordinate system:

Projection:	Lambert Conformal Conic
Units:	meters
Datum:	NAD27
Spheroid:	Clarke1866
Central meridian	-120 30 00
Standard parallel	33 00 00
Standard parallel	45 00 00

To obtain copies of the digital data, do one of the following:

- Download from the USGS World Wide Web site: URL = <http://geopubs.wr.usgs.gov/open-file/of03-67/> OR [http://geopubs.wr.usgs.gov/docs/wrgis/state\\_geol\\_maps.html](http://geopubs.wr.usgs.gov/docs/wrgis/state_geol_maps.html) OR
- Anonymous FTP from **geopubs.wr.usgs.gov**, in the directory **pub/open-file/of03-67**

These Internet sites contain the spatial data and metadata for the geologic map of Oregon as ArcInfo exchange-format files (see listing of files in Appendix A). Formatted metadata (Federal Geographic Data Committee-compliant) is included as Appendix B.

To manipulate this data in a spatial database, you must have a GIS platform that is capable of importing ArcInfo interchange-format files.

## Obtaining Paper Maps

Printed copies of the Walker and MacLeod (1991) publication, Geologic Map of Oregon, are available for purchase from the U.S. Geological Survey Earth Science Information Center. Digital JPEG images of their map sheets are also available as **wm1991or\_map.jpg/.jgw/.aux** (georeferenced geologic map) and **wm1991or\_units.jpg** (correlation of map units). These files may be downloaded from the USGS public access World Wide Web site on the Internet using the URL = [http://geopubs.wr.usgs.gov/docs/wrgis/state\\_geol\\_maps.html](http://geopubs.wr.usgs.gov/docs/wrgis/state_geol_maps.html) OR <http://geopubs.wr.usgs.gov/open-file/of03-67/> OR they may be acquired via anonymous FTP from **geopubs.wr.usgs.gov** in the directory: **docs/wrgis**.

Paper copies of the geologic map created from the *orgeo* spatial database are not available from the U.S. Geological Survey. Paper copies of the map can be created by obtaining the digital spatial database (*orgeo*) and then creating a custom plot file in a GIS.

## **References Cited**

- Raines, G.L, Sawatzky, D.L., and Connors, K.A., 1996, Great Basin geoscience data base: U.S. Geological Survey , Digital Data Series DDS-41, 2 CD-ROMs
- Walker, G.W. and MacLeod, N.S., 1991, Geologic map of Oregon: U.S. Geological Survey, 2 plates, scale 1:500,000.

## **Appendix A – List of digital files in the Oregon GIS**

--Use the 'importfile.aml' or ArcToolbox to IMPORT all of the \*.e00 files for use in ArcInfo.

### **Primary ArcInfo exchange-format (\*.e00) and metadata (\*.met) files for the spatial digital database:**

- orgeo.e00 – line and poly dataset (contacts, faults, and map units) in Lambert Conformal Conic map projection
- orgeo.met – metadata

### **JPEG image (\*.jpg/.jgw/.aux) and metadata (\*.met) files for the Walker and MacLeod (1991) map sheets:**

- wm1991or\_map.jpg/.jgw/.aux – georeferenced raster image of geologic map
- wm1991or\_units.jpg/.aux – image of the original correlation of map units.
- wm1991or\_map.met – metadata for georeferenced raster

## Appendix B – Metadata file (orgeo.met) for the Oregon GIS

### Identification\_Information:

#### Citation:

##### Citation\_Information:

Originator: Walker, G.W.

Originator: MacLeod, N.S.

Originator: Miller, R.J.

Originator: Raines, G.L.

Originator: Connors, K.A.

Publication\_Date: 2003

Title: Spatial digital database for the geologic map of Oregon

Edition: 2.0

Geospatial\_Data\_Presentation\_Form: vector digital data

#### Series\_Information:

Series\_Name: Open-File Report

Issue\_Identification: 03-67

#### Publication\_Information:

Publication\_Place: Menlo Park, California

Publisher: U.S. Geological Survey

Online\_Linkage: <http://geopubs.wr.usgs.gov/open-file/of03-67/>

#### Description:

**Abstract:** This report publishes a geologic digital spatial database (OR GEO) for the geologic map of Oregon by Walker and MacLeod (1991) which was originally printed on a single sheet of paper at a scale of 1:500,000 and accompanied by a second sheet for map unit descriptions and ancillary data. The spatial digital database (GIS) provided in this report supersedes an earlier digital edition by Raines and others (1996).

**Purpose:** This report is one of many being created by the U.S. Geological Survey as an ongoing effort to provide geologic process and mineral resource information for use in spatial analysis in a geographic information system (GIS). This database can be queried in many ways to produce a variety of geologic maps. This database is not meant to be used or displayed at any scale larger than 1:500,000 (for example, 1:100,000).

**Supplemental\_Information:** The digital geologic map of Oregon consists of a single coverage (OR GEO) which contains map units and lines. The feature attribute tables include a geologic linework table, OR GEO.AAT, that relates to the OR GEO.CON (contacts and boundaries), OR GEO.ST2 (structures), and OR GEO.REF (source reference) files, and a rock unit table, OR GEO.PAT, that relates to the OR GEO.RU (rock unit) and OR GEO.REF (source reference) files.

#### Time\_Period\_of\_Content:

##### Time\_Period\_Information:

##### Single\_Date/Time:

Calendar\_Date: 2003

Currentness\_Reference: publication date

#### Status:

Progress: Complete

Maintenance\_and\_Update\_Frequency: None planned

#### Spatial\_Domain:

##### Bounding\_Coordinates:

West\_Bounding\_Coordinate: -125.391158

East\_Bounding\_Coordinate: -116.418390

North\_Bounding\_Coordinate: 46.355947

South\_Bounding\_Coordinate: 41.906947

#### Keywords:

##### Theme:

Theme\_Keyword\_Thesaurus: none

Theme\_Keyword: geology  
 Theme\_Keyword: geologic map  
 Theme\_Keyword: geospatial database  
 Theme\_Keyword: state map

## Place:

Place\_Keyword\_Thesaurus: none  
 Place\_Keyword: Oregon  
 Place\_Keyword: State of Oregon  
 Place\_Keyword: USA  
 Place\_Keyword: Pacific Northwest

Access\_Constraints: none

## Use\_Constraints:

This digital database is not intended to be used or displayed at any scale larger than 1:500,000.

Any hardcopies utilizing these data sets shall clearly indicate their source. If the user has modified the data in any way they are obligated to describe the types of modifications they have performed on the hardcopy map. User specifically agrees not to misrepresent these data sets, nor to imply that changes they made were approved by the U.S. Geological Survey.

This database has been approved for release and publication by the Director of the USGS. Although this database has been subjected to rigorous review and is substantially complete, the USGS reserves the right to revise the data pursuant to further analysis and review. Furthermore, it is released on condition that neither the USGS nor the United States Government may be held liable for any damages resulting from its authorized or unauthorized use.

## Point\_of\_Contact:

## Contact\_Information:

Contact\_Person\_Primary:  
 Contact\_Person: Robert J. Miller  
 Contact\_Organization: U.S. Geological Survey  
 Contact\_Position: geologist  
 Contact\_Address:  
 Address\_Type: mailing address  
 Address: 345 Middlefield Road, Mail Stop 901  
 City: Menlo Park  
 State\_or\_Province: California  
 Postal\_Code: 94025  
 Country: USA  
 Contact\_Voice\_Telephone: 650 329-5407  
 Contact\_Electronic\_Mail\_Address: rjmiller@usgs.gov

## Data\_Set\_Credit:

The National Mapping Division of the U.S. Geological Survey scanned and vectorized mylar compilation sheets and converted the files to ArcInfo; Gary L. Raines and Katherine A. Connors added a data model and additional attribute data for an initial digital edition (Raines and others, 1996) of the Walker and MacLeod (1991) geologic map of Oregon.

This second digital edition, prepared by Robert J. Miller, represents further revision of Raines and others' (1996) first edition.

Native\_Data\_Set\_Environment: Microsoft Windows 2000 Version 5.0 (Build 2195) Service Pack 4; ESRI ArcCatalog 8.3.0.800

## Data\_Quality\_Information:

Logical\_Consistency\_Report: Polygon and chain-node topology present. Segments making up the outer and inner boundaries of a polygon tie end-to-end to completely enclose the area. Line segments are a set of sequentially numbered coordinate pairs. No duplicate features exist nor duplicate points in a data string.

Intersecting lines are separated into individual line segments at the point of intersection. All nodes are represented by a single coordinate pair, which indicates the beginning or end of a line segment.

Completeness\_Report: All geologic units were captured from Walker and MacLeod (1991) at a scale of 1:500,000.

Positional\_Accuracy:

Horizontal\_Positional\_Accuracy:

Horizontal\_Positional\_Accuracy\_Report: Database linework generally fits a scanned and georeferenced image of the original printed map with an error typically of 200-300 meters. The image used for comparison had a registration RMS error of 91 meters. This information is useful only in evaluating how well the digital database recreates the original printed map, but does not provide any information regarding the locational accuracy of the geologic features shown on the original printed map.

Lineage:

Source\_Information:

Source\_Citation:

Citation\_Information:

Originator: Walker, G.W.

Originator: MacLeod, N.S.

Publication\_Date: 1991

Title: Geologic Map of Oregon

Geospatial\_Data\_Presentation\_Form: map

Series\_Information:

Series\_Name: State Geologic Map

Issue\_Identification: Geologic Map of Oregon

Publication\_Information:

Publication\_Place: Reston, Virginia

Publisher: U.S. Geological Survey

Source\_Scale\_Denominator: 500000

Type\_of\_Source\_Media: mylar

Source\_Time\_Period\_of\_Content:

Time\_Period\_Information:

Single\_Date/Time:

Calendar\_Date: 1991

Source\_Currentness\_Reference: publication date

Source\_Citation\_Abbreviation: Walker and MacLeod, 1991

Source\_Contribution: The map provided spatial location information in an analog format.

Source\_Information:

Source\_Citation:

Citation\_Information:

Originator: Raines, G.L.

Originator: Sawatzky, D.L.

Originator: Connors, K.A.

Publication\_Date: 1996

Title: Great Basin geoscience data base

Edition: 1.0 (although not specified as such on that publication)

Geospatial\_Data\_Presentation\_Form: vector digital data

Series\_Information:

Series\_Name: Digital Data Series

Issue\_Identification: DDS-41

Publication\_Information:

Publication\_Place: Washington, D.C.

Publisher: U.S. Geological Survey

Type\_of\_Source\_Media: CD-ROM

Source\_Time\_Period\_of\_Content:

Time\_Period\_Information:

Single\_Date/Time:

Calendar\_Date: 1991

Source\_Currentness\_Reference: publication date of Geologic Map of Oregon by Walker and MacLeod.

Source\_Citation\_Abbreviation: Raines and others, 1996

Source\_Contribution: The first edition (Raines and others, 1996) was used to prepare the second edition (Walker and others, 2003) of GIS for Walker and MacLeod's (1991) Geologic map of Oregon.

Process\_Step:

Process\_Description:

George W. Walker and Norman S. MacLeod compiled the geology on 1:400,000-scale quadrants of the 1982 version of the Oregon topographic basemap.

USGS (National Mapping Division, Thematic Map Unit) personnel digitized and reprojected the compiled geology to the 1982 1:500,000-scale state base map: this work was done on a SCITEX system. The SCITEX files were then converted to an ArcInfo format.

Process\_Date: 1990-1991

Source\_Produced\_Citation\_Abbreviation: Walker and MacLeod, 1991

Process\_Step:

Process\_Description:

Proof plots were made from the digital files and reviewed by various geologists familiar with Oregon geology. A few misidentified polygons were found and the labels corrected. A data model was added and additional attributes coded.

During the initial digitization process, lines representing faults had been captured in a file separate from the geology unit polygons. A USGS contractor edited the fault linework to connect dotted and dashed fault segments into continuous lines. Fault type as well as downdrop direction were added as attributes.

Source\_Used\_Citation\_Abbreviation: Walker and MacLeod, 1991

Process\_Date: 1993-1996

Source\_Produced\_Citation\_Abbreviation: Raines and others, 1996

Process\_Step:

Process\_Description:

For this second edition of the spatial database, the geologic unit and fault coverages were merged to produce a single topology.

Faults forming geologic unit boundaries (contacts) occurred twice in the Raines and others (1996) dataset, once in the fault coverage (coded as a fault) and a second time in the geology coverage (coded as a "contact").

During the process of topologically combining the two coverages, if a fault and a contact were coincident (+/- approx. 300 meters), the contact was eliminated and the remaining line retained the attribute coding inherited from the fault coverage.

The topological combination of geology and fault cover was accomplished as follows:

- 1) A buffer of fault lines was built with a buffer distance of 300 meters.
- 2) The buffer was intersected with the geology coverage, thus creating nodes at the approximate ends of sections of arc in the geology coverage that are duplicated by faults.
- 3) The faults were buffered again, this time at 325 meters. This buffer coverage was used to select the duplicate sections of arcs created in step 2. The selected arcs were deleted.
- 4) The fault arcs were imported into the geology coverage. Dangling contacts in the coverage were extended to intersect the imported faults. Extensive proofing and editing was required to insure that the geologic unit polygons closed properly against the introduced fault arcs.

The entire ORGEO coverage was rubbersheeted to improve the fit with a georeferenced image of the basemap. The error in registration of the Raines and others (1996) dataset was typically 200-500 meters in the western part, but reached a maximum of 800-900 meters in the eastern third of the map sheet. After adjustment, the registration of the dataset generally is within 200-400 meters. The adjustment was accomplished by defining approximately 200 adjustment links throughout the map area, then interpolating between those links to form a uniform distribution of approximately 10,000 links across the map. The high density of links provided a smooth transition in both direction and magnitude of adjustment from one area of the map to another.

In order allow the dataset to be combined with map databases for adjacent states, modifications were made to database linework near the perimeter of the map area:

- 1) the map was cropped on the north along the Washington state boundary (generally following the center of the Columbia River).
- 2) the eastern and southern boundaries were replaced by state boundaries derived from USGS 1:100,000-scale Digital Line Graph (DLG) files.

Staff at the Oregon Department of Geology and Mineral Industries reviewed the resultant geologic map database and identified thirty-one incorrectly labeled polygons. R.J. Miller then incorporated the revisions into the GIS.

Source\_Used\_Citation\_Abbreviation: Raines and others, 1996

Process\_Date: 2000-2003

Source\_Produced\_Citation\_Abbreviation: Walker and others, 2003

Process\_Step:

Process\_Description: Pamela D. Derkey ran mp 2.8.18 (<http://geo-nsdi.er.usgs.gov/validate.php>) on the metadata file, made necessary corrections to the metadata, and imported the metadata into the ORGEO coverage.

Process\_Date: 20050105

Spatial\_Data\_Organization\_Information:

Direct\_Spatial\_Reference\_Method: Vector

Point\_and\_Vector\_Object\_Information:

SDTS\_Terms\_Description:

SDTS\_Point\_and\_Vector\_Object\_Type: Complete chain

Point\_and\_Vector\_Object\_Count: 62104

SDTS\_Terms\_Description:

SDTS\_Point\_and\_Vector\_Object\_Type: Label point

Point\_and\_Vector\_Object\_Count: 17365

SDTS\_Terms\_Description:

SDTS\_Point\_and\_Vector\_Object\_Type: GT-polygon composed of chains

Point\_and\_Vector\_Object\_Count: 17364

SDTS\_Terms\_Description:

SDTS\_Point\_and\_Vector\_Object\_Type: Node, planar graph

Point\_and\_Vector\_Object\_Count: 49852

SDTS\_Terms\_Description:

SDTS\_Point\_and\_Vector\_Object\_Type: Point

Point\_and\_Vector\_Object\_Count: 4

Spatial\_Reference\_Information:

Horizontal\_Coordinate\_System\_Definition:

Planar:

Map\_Projection:

Map\_Projection\_Name: Lambert Conformal Conic

Lambert\_Conformal\_Conic:

Standard\_Parallel: 33.000000

Standard\_Parallel: 45.000000

Longitude\_of\_Central\_Meridian: -120.500000

Latitude\_of\_Projection\_Origin: 0.000000

False\_Easting: 0.000000

False\_Northing: 0.000000

Planar\_Coordinate\_Information:

Planar\_Coordinate\_Encoding\_Method: coordinate pair

Coordinate\_Representation:

Abscissa\_Resolution: 0.004511

Ordinate\_Resolution: 0.004511

Planar\_Distance\_Units: meters

Geodetic\_Model:

Horizontal\_Datum\_Name: North American Datum of 1927

Ellipsoid\_Name: Clarke 1866  
 Semi-major\_Axis: 6378206.400000  
 Denominator\_of\_Flattening\_Ratio: 294.978698  
 Entity\_and\_Attribute\_Information:  
 Detailed\_Description:  
 Entity\_Type:  
   Entity\_Type\_Label: ORGEO.AAT  
   Entity\_Type\_Definition:  
     Arc Attribute Table  
     ESRI feature attribute table for linear features (contacts, faults, and folds)  
   Entity\_Type\_Definition\_Source: ESRI  
 Attribute:  
   Attribute\_Label: FID  
   Attribute\_Definition: Internal feature number.  
   Attribute\_Definition\_Source: ESRI  
   Attribute\_Domain\_Values:  
     Unrepresentable\_Domain: Sequential unique whole numbers that are automatically generated.  
 Attribute:  
   Attribute\_Label: Shape  
   Attribute\_Definition: Feature geometry.  
   Attribute\_Definition\_Source: ESRI  
   Attribute\_Domain\_Values:  
     Unrepresentable\_Domain: Coordinates defining the features.  
 Attribute:  
   Attribute\_Label: FNODE#  
   Attribute\_Definition: Internal node number for the beginning of an arc (from-node).  
   Attribute\_Definition\_Source: ESRI  
   Attribute\_Domain\_Values:  
     Unrepresentable\_Domain: Whole numbers that are automatically generated.  
 Attribute:  
   Attribute\_Label: TNODE#  
   Attribute\_Definition: Internal node number for the end of an arc (to-node).  
   Attribute\_Definition\_Source: ESRI  
   Attribute\_Domain\_Values:  
     Unrepresentable\_Domain: Whole numbers that are automatically generated.  
 Attribute:  
   Attribute\_Label: LPOLY#  
   Attribute\_Definition: Internal node number for the left polygon.  
   Attribute\_Definition\_Source: ESRI  
   Attribute\_Domain\_Values:  
     Unrepresentable\_Domain: Whole numbers that are automatically generated.  
 Attribute:  
   Attribute\_Label: RPOLY#  
   Attribute\_Definition: Internal node number for the right polygon.  
   Attribute\_Definition\_Source: ESRI  
   Attribute\_Domain\_Values:  
     Unrepresentable\_Domain: Whole numbers that are automatically generated.  
 Attribute:  
   Attribute\_Label: LENGTH  
   Attribute\_Definition: Length of feature in internal units.  
   Attribute\_Definition\_Source: ESRI  
   Attribute\_Domain\_Values:  
     Unrepresentable\_Domain: Positive real numbers that are automatically generated.  
 Attribute:  
   Attribute\_Label: ORGEO#  
   Attribute\_Definition: Internal feature number.

Attribute\_Definition\_Source: ESRI  
 Attribute\_Domain\_Values:  
 Unrepresentable\_Domain: Sequential unique whole numbers that are automatically generated.

Attribute:  
 Attribute\_Label: ORGEO-ID  
 Attribute\_Definition: User-defined feature number.  
 Attribute\_Definition\_Source: ESRI  
 Attribute\_Domain\_Values:  
 Unrepresentable\_Domain: Non-sequential, non-unique whole numbers that were generated during the GIS creation and editing process by R.J. Miller.

Attribute:  
 Attribute\_Label: LINECODE  
 Attribute\_Definition: Numeric code used to identify type of linear feature.  
 Attribute\_Domain\_Values:  
 Unrepresentable\_Domain:  
 Linecodes > 0 and < 100 are used for contacts and boundaries which are described in the ORGEO.CON file.  
 Linecodes > 100 and < 600 represent structural features which are described in the ORGEO.ST2 file.

Attribute:  
 Attribute\_Label: NAME  
 Attribute\_Definition: Name of fault  
 Attribute\_Domain\_Values:  
 Unrepresentable\_Domain: This item does not contain any information, because fault names were not given in Walker and MacLeod (1991).

Attribute:  
 Attribute\_Label: SOURCE\_ID  
 Attribute\_Definition: Numeric code used to identify the data source for the linear feature.  
 Attribute\_Domain\_Values:  
 Enumerated\_Domain:  
 Enumerated\_Domain\_Value: 1  
 Enumerated\_Domain\_Value\_Definition: U.S. Geological Survey, 1993  
 Enumerated\_Domain:  
 Enumerated\_Domain\_Value: 41  
 Enumerated\_Domain\_Value\_Definition: Walker and MacLeod, 1991  
 Unrepresentable\_Domain: Complete references for the sources are listed in the ORGEO.REF look-up table.

Attribute:  
 Attribute\_Label: SPATIAL\_OBJ\_ID  
 Attribute\_Definition: Non-unique numeric identifier for each object in the ORGEO feature attribute tables (ORGEO.AAT and ORGEO.PAT). (This integer is NOT duplicated in the ORGEO.PAT feature attribute table.)  
 Attribute\_Domain\_Values:  
 Unrepresentable\_Domain: Values range from a low of 20200041 to a high of 410230365.

Attribute:  
 Attribute\_Label: FAULT\_CONT  
 Attribute\_Definition: Indicates if fault constitutes a contact between rock units  
 Attribute\_Domain\_Values:  
 Enumerated\_Domain:  
 Enumerated\_Domain\_Value: yes  
 Enumerated\_Domain\_Value\_Definition: fault IS a contact between rock units  
 Enumerated\_Domain:  
 Enumerated\_Domain\_Value: no  
 Enumerated\_Domain\_Value\_Definition: fault is NOT a contact between rock units  
 Enumerated\_Domain:  
 Enumerated\_Domain\_Value: (no entry)  
 Enumerated\_Domain\_Value\_Definition: The feature is NOT a fault.

Attribute:  
 Attribute\_Label: DWNTHRWN  
 Attribute\_Definition: Indicates the sense of movement on the fault.  
 Attribute\_Domain\_Values:  
 Enumerated\_Domain:  
 Enumerated\_Domain\_Value: e  
 Enumerated\_Domain\_Value\_Definition: East side of fault is downdropped with respect to the west side of the fault.  
 Enumerated\_Domain:  
 Enumerated\_Domain\_Value: n  
 Enumerated\_Domain\_Value\_Definition: North side of fault is downdropped with respect to the south side of the fault.  
 Enumerated\_Domain:  
 Enumerated\_Domain\_Value: ne  
 Enumerated\_Domain\_Value\_Definition: Northeast side of fault is downdropped with respect to the southwest side of the fault.  
 Enumerated\_Domain:  
 Enumerated\_Domain\_Value: nw  
 Enumerated\_Domain\_Value\_Definition: Northwest side of fault is downdropped with respect to the southeast side of the fault.  
 Enumerated\_Domain:  
 Enumerated\_Domain\_Value: s  
 Enumerated\_Domain\_Value\_Definition: South side of fault is downdropped with respect to the north side of the fault.  
 Enumerated\_Domain:  
 Enumerated\_Domain\_Value: se  
 Enumerated\_Domain\_Value\_Definition: Southeast side of fault is downdropped with respect to the northwest side of the fault.  
 Enumerated\_Domain:  
 Enumerated\_Domain\_Value: sw  
 Enumerated\_Domain\_Value\_Definition: Southwest side of fault is downdropped with respect to the northeast side of the fault.  
 Enumerated\_Domain:  
 Enumerated\_Domain\_Value: w  
 Enumerated\_Domain\_Value\_Definition: West side of fault is downdropped with respect to the east side of the fault.  
 Enumerated\_Domain:  
 Enumerated\_Domain\_Value: (no entry)  
 Enumerated\_Domain\_Value\_Definition: no movement was observed  
 Unrepresentable\_Domain:  
 The side indicated by the compass direction (e, n, ne, nw, s, se, sw, or w) is downdropped.  
 No value indicates that movement EITHER did not occur OR was not recorded.  
 Detailed\_Description:  
 Entity\_Type:  
 Entity\_Type\_Label: ORGEO.PAT  
 Entity\_Type\_Definition:  
 Polygon Attribute Table: map units  
 ESRI feature attribute table for rock units  
 Entity\_Type\_Definition\_Source: ESRI  
 Attribute:  
 Attribute\_Label: FID  
 Attribute\_Definition: Internal feature number.  
 Attribute\_Definition\_Source: ESRI  
 Attribute\_Domain\_Values:  
 Unrepresentable\_Domain: Sequential unique whole numbers that are automatically generated.  
 Attribute:

Attribute\_Label: Shape  
 Attribute\_Definition: Feature geometry.  
 Attribute\_Definition\_Source: ESRI  
 Attribute\_Domain\_Values:  
   Unrepresentable\_Domain: Coordinates defining the features.

Attribute:  
 Attribute\_Label: AREA  
 Attribute\_Definition: Area of feature in internal units squared.  
 Attribute\_Definition\_Source: ESRI  
 Attribute\_Domain\_Values:  
   Unrepresentable\_Domain: Positive real numbers that are automatically generated.

Attribute:  
 Attribute\_Label: PERIMETER  
 Attribute\_Definition: Perimeter of feature in internal units.  
 Attribute\_Definition\_Source: ESRI  
 Attribute\_Domain\_Values:  
   Unrepresentable\_Domain: Positive real numbers that are automatically generated.

Attribute:  
 Attribute\_Label: ORGEO#  
 Attribute\_Definition: Internal feature number.  
 Attribute\_Definition\_Source: ESRI  
 Attribute\_Domain\_Values:  
   Unrepresentable\_Domain: Sequential unique whole numbers that are automatically generated.

Attribute:  
 Attribute\_Label: ORGEO-ID  
 Attribute\_Definition: User-defined feature number.  
 Attribute\_Definition\_Source: ESRI  
 Attribute\_Domain\_Values:  
   Unrepresentable\_Domain: Non-sequential unique whole numbers that were generated during the GIS creation and editing process by R.J. Miller.

Attribute:  
 Attribute\_Label: MAP\_UNIT  
 Attribute\_Definition: Map unit designation (rock unit label) as it appeared on the printed Walker and MacLeod (1991) map.  
 Attribute\_Domain\_Values:  
   Unrepresentable\_Domain: Map unit is described in the ORGEO.RU look-up table.

Attribute:  
 Attribute\_Label: UNIT  
 Attribute\_Definition: Numeric code used to identify rock unit.  
 Attribute\_Domain\_Values:  
   Unrepresentable\_Domain: Attributes and attribute definitions are given in the ORGEO.RU look-up table.

Attribute:  
 Attribute\_Label: SOURCE\_ID  
 Attribute\_Definition: Numeric code used to identify the data source for the rock unit.  
 Attribute\_Domain\_Values:  
   Unrepresentable\_Domain: Complete references for the sources are listed in the ORGEO.REF look-up table.

Attribute:  
 Attribute\_Label: SPATIAL\_OBJ\_ID  
 Attribute\_Definition: Unique numeric identifier for each object in the ORGEO feature attribute tables (ORGEO.AAT and ORGEO.PAT). (This integer is NOT duplicated in the ORGEO.AAT feature attribute table.)  
 Attribute\_Domain\_Values:  
   Range\_Domain:  
     Range\_Domain\_Minimum: 410100001

Range\_Domain\_Maximum: 410117371

Detailed\_Description:

Entity\_Type:

Entity\_Type\_Label: orgeo.nat

Attribute:

Attribute\_Label: FID

Attribute\_Definition: Internal feature number.

Attribute\_Definition\_Source: ESRI

Attribute\_Domain\_Values:

Unrepresentable\_Domain: Sequential unique whole numbers that are automatically generated.

Attribute:

Attribute\_Label: Shape

Attribute\_Definition: Feature geometry.

Attribute\_Definition\_Source: ESRI

Attribute\_Domain\_Values:

Unrepresentable\_Domain: Coordinates defining the features.

Attribute:

Attribute\_Label: ARC#

Attribute:

Attribute\_Label: ORGEO#

Attribute\_Definition: Internal feature number.

Attribute\_Definition\_Source: ESRI

Attribute\_Domain\_Values:

Unrepresentable\_Domain: Sequential unique whole numbers that are automatically generated.

Attribute:

Attribute\_Label: ORGEO-ID

Attribute\_Definition: User-defined feature number.

Attribute\_Definition\_Source: ESRI

Distribution\_Information:

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Contact\_Person: Robert J. Miller

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Contact\_Instructions:

This report is only available in electronic format at

URL = <http://geopubs.wr.usgs.gov/open-file/of03-67/>

OR via a link from

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OR via anonymous FTP from

[geopubs.wr.usgs.gov](http://geopubs.wr.usgs.gov), in the directory [pub/open-file/of03-67](http://geopubs.wr.usgs.gov/pub/open-file/of03-67)

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Standard\_Order\_Process:

Digital\_Form:

Digital\_Transfer\_Information:

Format\_Name: ARCE - ArcInfo export format

Transfer\_Size: 20.699

Digital\_Transfer\_Option:

Online\_Option:

Computer\_Contact\_Information:

Network\_Address:

Network\_Resource\_Name: <http://geopubs.wr.usgs.gov/open-file/of03-67/>

Network\_Resource\_Name: [http://geopubs.wr.usgs.gov/docs/wrgis/state\\_geol\\_maps.html](http://geopubs.wr.usgs.gov/docs/wrgis/state_geol_maps.html)

Fees: free

Metadata\_Reference\_Information:

Metadata\_Date: 20050105

Metadata\_Contact:

Contact\_Information:

Contact\_Person\_Primary:

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Contact\_Position: geologist

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Country: USA

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Metadata\_Standard\_Name: FGDC Content Standards for Digital Geospatial Metadata

Metadata\_Standard\_Version: FGDC-STD-001-1998

Metadata\_Time\_Convention: local time

Metadata\_Access\_Constraints: none

Metadata\_Use\_Constraints: none

Metadata\_Extensions:

Online\_Linkage: <http://www.esri.com/metadata/esriprof80.html>

Profile\_Name: ESRI Metadata Profile

Metadata\_Extensions:

Online\_Linkage: <http://www.esri.com/metadata/esriprof80.html>

Profile\_Name: ESRI Metadata Profile