

USA Potential

DIGITAL MAPPING TECHNIQUES 2015

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The contents of this document are provisional

See Presentations and Proceedings from the DMT Meetings (1997-2015) http://ngmdb.usgs.gov/info/dmt/

Two NCGMP09-Compliant Database Publications from the Volcano and Alaska Science Centers, U.S. Geological Survey (USGS)

By Evan E. Thoms

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INTRODUCTION

Two recently prepared geologic map databases, one newly published and one in review, follow the NCGMP09 (NCGMP09, 2010) specification for the organization of digital geologic map data. Posters describing the general schema and workflow for the creation of the databases were presented at the 2015 Digital Mapping Techniques Workshop (DMT) in Salt Lake City, Utah and are available online at http://foobar as Adobe PDF files.

BaranofSchema.pdf shows the workflow and schema of the digital geologic map database that accompanies Scientific Investigations Map 3335, Geologic map of Baranof Island, southeastern Alaska (Karl et al., 2015). The database was transcribed from ArcINFO coverages by Evan Thoms from the Alaska Science Center and edited thereafter as an ArcGIS file geodatabase.

The schema and workflow for an NCGMP09-compliant database to accompany Scientific Investigations Map 2832, Geologic map of Mount Mazama and Crater Lake, Oregon (Bacon, 2008) is shown in CraterLakeSchema.pdf. The translation of the original geologic map data from ArcINFO coverages to an ArcGIS file geodatabase in the NCGMP09 schema was done by Heather Bleick while an employee with the Volcano Science Center.

TOWARD A VISUAL README FORMAT

In preparing these posters, I realized I was exploring the expediency of creating "visual readmes" for the increasingly complex geologic map datasets the USGS is producing. I would argue that the current formats of text-based metadata and readme files for geologic map databases do not lend themselves to quickly understanding the breadth, depth, and schema details of the data, especially for users who may lack the skills or software to investigate the data within a GIS. A single illustrated document might be easier to interpret than a readme file, cross-referenced against the NCGMP09 documentation, and the metadata. Not to mention that text-only formats are inadequate for poster presentations.

The layout of a visual readme document might contain the following items:

- An index map, or a set of index maps at successively larger scales, to show the geographic extent of the data.
- Separate map frames showing the features of just one feature class with a linked list of field names.
- Relationship lines or color-coded links between fields and other tables to which they might share relationships, including domain values.
- The list of topology rules.
- Definitions of tables, fields, domain values, and Glossary terms.
- A clear explanation of how features are symbolized and the names of style or layer files.
- The principle process steps followed during the creation of the database.

Consider an exploded diagram of a geodatabase with relationship lines (or some other symbolization) between graphical or text-based representations of the different parts. It has the potential to eliminate much page-turning through the NCGMP09 standard, file browsing, and metadata deciphering. All of the relevant information can be encoded in objects within a geodatabase (domains, relationship classes, DataSources table, a ProcessStep table, etc.) and could be called, along with the GIS-calculated metadata (spatial reference, geographic extent, feature counts, geometry details, etc.) in a script that would build the document.

An existing, but soon to be obsolete utility (see this GeoNet discussion thread: https://geonet.esri.com/thread/118432), which automates the production of some of these items is ArcGIS Diagrammer (Version 10.0.1, ESRI, 2008). It was designed for database designers to edit or analyze ArcGIS database schemas in Visual Studio and is thus more complicated than necessary to create a simple visual readme. Still, it is the program I used to create the table graphics seen in the posters and it offers HTML views of separated feature class maps, enumerated domain values, and field metadata, among other information. For the time being, this software is probably the best starting point for creating visual readme layouts.

A visual readme could be included with the publication or generated in a poster format for presentation. The posters I created for DMT do not represent the ideal product, but I am intrigued by the result and the possibility for future work.

Any use of trade, firm, or product names is for descriptive purposes only and does not imply endorsement by the U.S. Government

REFERENCES

- ArcGIS Diagrammer (Version 10.0.1)[computer software].(2008). Redlands, CA: ESRI Inc. Retrieved from http://www.arcgis.com/home/item.html?id=51b6066bfd024962999f6903682d8978.
- Bacon, C.R., 2008, Geologic Map of Mount Mazama and Crater Lake Caldera, Oregon: U.S. Geological Survey Scientific Investigations Map 2832, 4 sheets, 49 p., http://pubs.er.usgs.gov/publication/sim2832.
- Karl, S.M., Haeussler, P.J., Himmelberg, G.R., Zumsteg, C.L., Layer, P.W., Friedman, R.M., Roeske, S.M., and Snee, L.W., 2015, Geologic map of Baranof Island, southeastern

Alaska: U.S. Geological Survey Scientific Investigations Map 3335, pamphlet 82 p., <u>http://dx.doi.org/10.3133/sim3335</u>.

NCGMP (USGS National Cooperative Geologic Mapping Program), 2010, NCGMP09—Draft standard format for digital publication of geologic maps, version 1.1, in Soller, D.R., ed., Digital Mapping Techniques '09—Workshop Proceedings: U.S. Geological Survey Open-file Report 2010–1335, p. 93–146, http://pubs.usgs.gov/of/2010/1335/ pdf/usgs_of2010-1335_NCGMP09.pdf.



NCGMP09 geodatabase for the geologic map of Mount Mazama and Crater Lake Caldera, Oregon by Heather Bleick, USGS; Evan Thoms, USGS, (ethoms@usgs.gov)

Planned to be published:

GeologicMap Feature Dataset

SHAPE

Symbol

CONTOU

BASE_Type

VolcanicPoints

Feature Class

Fields

1-03-01-02-02

01-03-01-03

DMUUnit2

DMUUnit

About this work:

The Volcano Science Center of the USGS has begun applying the NCGMP09 standard for geologic map databases to both new and legacy publications. Heather Bleick completed the transcription shown here of legacy GIS data in 2014 but died with the publication still in review. Believing that her efforts deserve attention as another example of applying the NCGMP09 standard, I have produced this poster but take no credit for the authorship of the database. - Evan Thoms

Workflow (from the metadata)

Map sheet

This ArcGIS geodatabase is a transcription of the ArcInfo coverages (Ramsey and others, 2008) that were constructed in order to produce a geologic map (Bacon, 2008) as a basis for understanding processes and volcano hazards involved in the eruptions of Crater Lake Volcano.

- Changes from the ArcInfo coverages to ArcGIS geodatabase include:
- 1) Converted the previously published quad-by-quad coverages in ArcInfo 7.2 to the more modern and widely used geodatabase in ArcGIS 10.2. In order to do this coverages were merged and imported into a geodatabase.
- 2)Then quadrangle boundaries were eliminated and contact lines were snapped to recreate new polygons. This will allow users to use seamless data across quadrangle boundaries.
- 3) Additionally, feature classes in the geodatabase were updated with the fields and layout by the NCGMP09 schema. Tables including DataSources, DescriptionOfMapUnits, and Glossary were created again following the NCGMP09 schema.
- 4) Lastly, metadata using the FGDC format was created reflecting updates and changes to the data. The FGDC metadata is embedded in the geodatabase and all accompanying files.

Geodatabase objects

DSXXXXGeologicMapCraterLake.gdb

ContactsAndFaults

GeoChronPoints

💾 ContactsAndFaultsExistenceConfidence Glossary

ContactsAndFaultsIdentityConfidence_Glossary

ContactsAndFaultsType_Glossary

MapUnitPolys

VolcanicPoints

DescriptionOfMapUnits

🖃 🖶 GeologicMap

🛨 BaseMaps

DataSources

Glossary

-

Geologic Map of Mount Mazama and Cra



Bleick, H.A., Ramsey, D.W., Dutton, D. R., Bacon, C.R, XXXX, Database for the Geologic Map of Mount Mazama and Crater Lake Caldera, Oregon:

U.S. Geological Survey, Data Series XXXX, Geodatabase; FGDC Styles/Fonts; Shapefile; Readme; Metadata

GeologicMap_Topology



OBJECTID SHAPE_Length GeoChronPointsAgeUnits_Glossary Shape GeoChronPointsMapUnit_DMU VolcanicPoints_ID GeoChronPointsType_Glossary VolcanicPointsType_Glossary Туре MapUnitPolysIdentityConfidence_Glossary IdentityConfidence MapUnitPolysMapUnit_DMU VolcanicPointsIdentityConfidence_Glossary Label VolcanicPointsIdentityConfidence_Glossary VolcanicPointsMapUnit_DMU Symbol VolcanicPointsType_Glossary SymbolRotation PlotAtScale Notes ..SourceID_DataSources DataSourceID **Correlation of map units sheet** LocationConfidenceMeters MapUnit Not included in geodatabase ExtendedAttributesID **Standalone tables DescriptionOfMapUnits DataSources** Glossary Table Table Fields Fields Fields OBJECTID OBJECTID OBJECTID Glossary_ID DataSources_ID DescriptionOfMapUnits_ID MapUnit Term Source Label Notes Definition ..SourceID_DataSources Name Relationship DefinitionSourceID FullName (All coded domain values are Age defined in the Glossary) DMUGeneralLithology_Glossary Description Relationshir GeneralLithology GeneralLithologyConfidence DMUGeneralLithologyConfidence_Glossary HierarchyKey ParagraphStyle Symbol ..SourceID_DataSources DescriptionSourceID

DescriptionOfMapUnits table to MSWord docx using 'DMU to .docx' tool in NCGMP09v1.1_Toolbox1_Arc10.tbx.

Pyroclastic of basaltic andesite of William late Pleistocene

Basaltic andesite northwest of Red Basaltic andesite northwest of Red Cone late Pleistocene

DescriptionOfMapUnits_ID	MapUnit *	Label	Name	FullName	Age	Description	GeneralLithology	GeneralLithologyConfidence	HierarchyKey	Paragraph Style	Symbol	Description SourceID
DMU001	<nul></nul>		DESCRIPTION OF MAP UNITS			<nul></nul>	<null></null>	<null></null>	01	DMU-Heading1		DAS03
DMU002	<nul></nul>					[Labels ending in the letter "p" indicate pyro	<null></null>	<null></null>	01-01	DMUHeadnote		DAS03
DMU003	<nul></nul>		SEDIMENTARY DEPOSITS			<nul></nul>	<null></null>	<null></null>	01-02	DMU-Heading2		DAS03
DMU004	al	al	Alluvium	Alluvium	Holocene	Unconsolidated water-transported mud, san	Alluvial sediment	certain	01-02-01	DMUUnit1		DAS03
DMU005	sl	sl	Sediment gravity-flow deposits	Sediment gravity-flow deposits	Holocene	Clastic sediment in the three major basins	Sediment	certain	01-02-02	DMUUnit1		DAS03
DMU006	t	t	Talus	Talus	Holocene and Pleistocene	Unconsolidated talus and thick colluvium (e	Clastic sediment	questionable	01-02-03	DMUUnit1		DAS03
DMU007	ls	ls	Landslide deposits	Landslide deposits	Holocene	Landslide and debris-avalanche deposits, m	Debris flows, landslides, and other lo	certain	01-02-04	DMUUnit1		DAS03
DMU008	9	9	Glacial deposits, undivided	Glacial deposits, undivided	Pleistocene	Till and minor associated outwash forming a	Glacial till	certain	01-02-05	DMUUnit1		DAS03
DMU009	s	s	Sedimentary deposits, undivided	Sedimentary deposits, undivided	late and middle Pleistocene	Deposits of clastic sediment exposed local	Clastic sediment	certain	01-02-06	DMUUnit1		DAS03
DMU010	<nul></nul>		VOLCANIC ROCKS			<nul></nul>	<null></null>	<nul></nul>	01-03	DMU-Heading2		DAS03
DMU011	<nul></nul>		Regional volcanism, northwest			<nul></nul>	<null></null>	<nul></nul>	01-03-01	DMU-Heading3		DAS03
DMU012	<nul></nul>		Basaltic andesite northwest of Willi				<null></null>	<nul></nul>	01-03-01-01	DMUUnit1		DAS03
DMU013	bwn	bwn	Lava	Lava of basaltic andesite northwest of Wil	late Pleistocene	Medium-dark-gray porphyritic basaltic ande	Mafic-composition lava flows	certain	01-03-01-01-01	DMUUnit2		DAS03
DMU014	bwnp	bwnp	Pyroclastic	Pyroclastic of basaltic andesite northwest	late Pleistocene	Medium-dark-gray porphyritic ba-saltic ande	Mafic-composition pyroclastic flows	certain	01-03-01-01-02	DMUUnit2		DAS03
DMU015	<nul></nul>		Basaltic andesite of Williams Crater				<null></null>	<null></null>	01-03-01-02	DMUUnit1		DAS03
DMU016	bw	bw	Lava	Lava of basaltic andesite of Williams Crat	late Pleistocene	Medium-gray porphyritic basaltic andesite (Mafic-composition lava flows	certain	01-03-01-02-01	DMUUnit2		DAS03

Medium-gray porphyritic basaltic andesite (Mafic-composition pyroclastic flows certain

Medium-gray porphyritic basaltic andesite (Mafic-composition lava flows

Domains - created from values in _<field name> and then assigned to the field

actsAndFaults_Type	DescriptionOfMapUnits_MapUnit Coded Value Domain	DescriptionOfMapUnits_GeneralLithol Coded Value Domain	Confidence Coded Value Domain	GeoChronPoints_AgeUnits Coded Value Domain	Coded Value Domain
alle bolhain ct (contact) (dike) val contact (internal contact) · boundary (water boundary) al fault (normal fault) o (slump) orm crest (bedform crest) ine crest (moraine crest) boundary (map boundary)	al (al) sl (sl) t (t) ls (ls) g (g) s (s) bwn (bwn) bwnp (bwnp) bw (bw) bwp (bwp) brw (brw) brw (brw) br (br) 180 units (This domain is assigned to all MapUnit fields)	Alluvial sediment (Alluvial sediment) Sediment (Sediment) Clastic sediment (Clastic sediment) Debris flows, landslides, and other localiz Glacial till (Glacial till) Mafic-composition lava flows (Mafic-comp Mafic-composition pyroclastic flows (Mafi Coarse-grained, mafic-composition intrus Intrusive igneous rock (Intrusive igneous Felsic-composition lava flows (Felsic-com Volcaniclastic (fragmental) material (Volc Felsic-composition air-fall tephra (Felsic-c Pyroclastic flows (Pyroclastic flows) Intermediate-composition lava flows (Inte	certain (certain) questionable (questionable) Inferred (Inferred) (This domain is assigned to all ExistenceConfidence and IdentityConfidence fields)	ka (ka) DescriptionOfMapUnits_ParagraphSty Coded Value Domain DMU-Heading1 (DMU-Heading1) DMU Unit 1 (DMU Unit 1) DMU-Heading3 (DMU-Heading3) DMU Unit 1 (1st after heading) (DMU Uni DMU Unit 2 (DMU Unit 2) DMU-Heading2 (DMU-Heading2)	vent (vent) vent, concealed (vent, concea geothermal well (geothermal GeoChronPoints_Type Coded Value Domain K-Ar or 40Ar/39Ar (K-Ar or 40

			DMU019 <null> Basaltic andesite of F</null>	Red Cone	Inht to modium array parahysitis baselitis a Mafia compacities lays flows	01-03-01-04 DMUUnit1 DAS03
			DMU020 br br Lava	Pvroclastic of basaltic andesite of Red C late Pleistocene	Light- to medium-gray porphyric basalic a Maric-composition lava nows certain	01-03-01-04-01 DM0Unit2 DA803
D						
Proces	ss notes					
			DESCRIPTION OF MAP UNITS	and fine-grained sand thought to have been deposited by sheet-flow turbidit	ity moraines, dates from the latest Pleistocene gla-ciation about 22–16 ka	suggest age of about 35 ka
				currents	(Rosenbaum and Reynolds, 2004). Older glacial deposits are present low in	bwnp Pyroclastic (late Pleistocene) Medium-dark-gray porphyritic ba-saltic andesite
			[Labels ending in the letter "p" indicate pyroclastic units, ending in the letter "i" indicate	t Talus (Holocene and Pleistocene)Unconsolidated talus and thick colluvium	the caldera walls between Pumice Point and Skell Head where their ages are	(52.5% SiO2) lava flow (bwn) and small cinder cone remnant (bwnp) 2.6 km
			intrusive units. Mineral abbrevia-tions: pl, plagioclase; ol, olivine; aug, augite; opx,	(especially in southwest corner of map). Beneath lake surface, includes pos	st- bracketed by K-Ar dates on lava flows (see panoramas on sheet 4 and	north-northwest of Williams Crater, west-northwest of the caldera. Vent
			orthopyroxene; hbl, hornblende; ap, apatite. Fe-Ti oxides are titanomagnetite and, in many silicic	7,700 yr B.P. talus, scree, sand, and probable debris-flow and minor landsli	ide discussion)	coincides with probable trace of Red Cone Spring fault. Lava flow is locally
			rocks, ferrian ilmenite. Total phenocryst contents (estimated volume percent) typically	material generally sloping at least 13°	s Sedimentary deposits, undivided (late and middle Pleistocene)Deposits of	exposed for ~2.5 km to west where it terminates near Pacific Crest National
			dominated by plagioclase; phases listed in order of decreasing volume percent. Microxeno-liths	ls Landslide deposits (Holocene)I andslide and debris-avalanche deposits mainly	clastic sediment exposed locally in the caldera walls. Typically inaccessible	Scenic Trail Rock contains abundant conspicuous gabbroic aggregates (<1
			are rock fragments; aggregates are bits of crystal mush with intergranular melt; and enclaves are	barred the surface of Casta Lala (Decay and there 2002). Compared of	s	sector run. Rock contains doutdain, conspectous guotion aggregates (_1
			undercooled blobs of magma (Nakada and others, 1994). SiO2 rounded to nearest 0.5 weight	beneain the surface of Crater Lake (Bacon and Others, 2002). Composed of	and poorly exposed, this unit probably consists of fanaric or focal fluvial	cm) of coarse $p_1 + o_1 + aug$. Compositionally and texturally similar but not
			percent (see discussion). Rock names are based on silica content: basalt, \leq 52 weight percent;	unconsolidated, poorly sorted, typically heterolithologic debris derived from	m sediment of various ages	identical to lava of unit bw (Bacon, 1990). Phenocrysts (~30%, including
			basaltic andesite, 52–57; andesite, 57–63; dacite, 63–68; and rhyodacite, 68–72. HAOT refers to	the caldera walls and transported into the lake by mass wasting. Debris-	VOLCANIC ROCKS	aggregates but excluding microphenocrysts): pl (≤ 4 mm, finely sieved), ol (≤ 3
			hich alumina alivina thelaiita of Hart and others (1084). Marina avugan isatana staase (MIS)	avalanche deposits have hummocky surfaces and contain lithic blocks as la	irge	mm), and aug (\leq 3 mm) in an intersertal groundmass. Overlies units ah and ad.
			Design and the distribution of the distributio	as many tens of meters in size in a matrix that may contain a range of partic	cle REGIONAL VOLCANISM, NORTHWEST	Undated. Paleomagnetic direction similar to that of bw and degree of
			after Bowen and others (1986) and Martinson and others (1987)]	sizes from clay to boulders. Largest debris-avalanche deposit, below Chask	ci Basaltic andesite northwest of Williams Crater	preser-vation suggest age of about 35 ka
			SEDIMENTARY DEPOSITS	Bay, has a volume of ≥0.2 km3 and traveled 2–3 km from its source	bwn Lava (late Pleistocene)Medium-dark-gray porphyritic basaltic andesite (52.5%	Basaltic andesite of Williams Crater
			al Alluvium (Holocene) Unconsolidated water-transported mud, sand, gravel, and	g Glacial deposits, undivided (Pleistocene)Till and minor associated outwash	SiO2) lava flow (bwn) and small cinder cone remnant (bwnp) 2.6 km north-	bw Lava (late Pleistocene)Medium-gray porphyritic basaltic andesite (51.5%
			coarser debris deposited in or adjacent to present-day streams. Typically	forming a discontinuous mantle on the slopes of Mount Mazama, lateral	northwest of Williams Crater, west-northwest of the caldera. Vent coincides	SiO2) lava flow (bw) and gravish-red cinders (bwp) of Williams Crater
			contains a large fraction of material reworked from denosits of elimentia	moraines extensive denosits west of long ~122°13' W and layers exposed	with probable trace of Red Cone Spring fault. Lava flow is locally exposed for	complex (see also unit mu) west of the caldera. Formerly known as Forgotten
				locally in the solders wells. Till is characterized by a hoteralithelogie	~2.5 km to west where it terminates near Pacific Crest National Scenic Trail.	Creater (Williams 1042) the einder some has been named in honor of
			eruption	iocany in the cattern wars. This is characterized by a neteronuloiogic	Prock contains abundant constituous aabhroic agaragatas (<1 cm) of coarse	Crater (winnams, 1942), the circle cone has been named in honor of
			sl Sediment gravity-flow deposits (Holocene)Clastic sediment in the three major	assem-blage of dense, abraded or rounded volcanic clasts and presence of	nt + nt + and Compositionally and trategille but not identical to log	volcanologist Howel Williams. The Williams Crater complex includes
			basins and in depressions on and between lava flows and landslide deposits on	ultrafine material in unsorted matrix. No attempt was made to divide unit in	nto pi + oi + aug. Compositionally and texturally similar but not identical to lava	basaltic andesite contaminated with gabbro (resulting in bulk SiO2 content of
			the floor of Crater Lake (Nelson and others, 1988; Bacon and others, 2002).	deposits of different ages. Till, overlain by Holocene pumice-fall deposits	of unit bw (Bacon, 1990). Pheno-crysts (~30%, including aggregates but	a basalt), dacite, and hybrid andesite (Bacon, 1990). The basaltic andesite
			Maximum thicknesses 75 m in the east basin and <50 m in the southwest and	west of Cleetwood Cove, near Palisade Point, and at Skell Head, as well as	excluding microphenocrysts): pl (≤4 mm, finely sieved), ol (≤3 mm), and aug	comprises the cinder cone, a lava flow locally exposed from 1 to 4 km west of
	[I.I. and a survey of I.I. and have Distribute master and invested		northwest basins (Nelson and others, 1986). Uppermost layers consist of mud	most till on the slopes of Mount Mazama and till that forms distinct lateral	(\leq 3 mm) in an intersertal groundmass. Overlies units ah and ad. Undated.	the west base of the cone and possibly vented from a fissure, and enclaves
	[Hard copy of Heather Bleick's notes pinned				Paleomagnetic direction similar to that of bw and degree of preservation	
	hara during procentation Contact Even Thoma					
	nere during presentation. Contact Evan monis					
	(othoms@usas gov) for a convl					
	(ethoms@usys.gov/for a copy]					
			within the dacite and hybrid andesite. Ubiquitous within the basaltic andesite	mm: larger crystals finely sieved), and any (<4 mm) in an intersertal to	microphenocrysts): of (≤ 5 mm), aug (≤ 4 mm) and pl (≤ 2 mm) in an	related brw. K-Ar age: 36+12 ka: 40Ar/39Ar plateau age: 35+4 ka. Samples
			are aphroic microvanoliths or aggregates (-2-10 mm) of various	intergranular groundmass. Overlies units bh. ah. and dub overlain by my	inter-granular groundmass. Phonocrust assemblages vary from al only to al +	with abundant aug annarently contain inherited 40Ar and do not vield
			are gaotore incrokenonius or aggregates (~2=10 min) or various	Intergranular groundmass. Over les units on, an, and uvo, overtain by inw.	inter-granutal groundmass. I nenocityst assemblages vary from of only to of +	with abundant and apparently contain innerticed 40At and do not yield
			combinations of oi, pi, and aug. Phenocrysts (~30%, excluding seriate pl	Undated. Smooth contact of bwp tephra on dvb at caldera wall south of Dev	aug to ot + aug + pl, phenocryst content increasing in that order.	meaningrui K-Ar ages
			microphenocrysts), many of which are derived from the grabbroic fragments:	Backbone suggests similar age, or about 35 ka	Microxenoliths (≤ 5 mm) of aug \pm ol \pm pl abundant in samples with those	boe Basalt east of Oasis Butte (late Pleistocene)Medium-gray porphyritic basalt lava
			ol (typically ≤3 mm, rarely to 6 mm), pl (typically ≤2.5 mm, commonly to 4	brw Basaltic andesite northwest of Red Cone (late Pleistocene)Medium-gray	phases as phenocrysts. Overlies units bo, boe, and arw; overlain by closely-	at north-northwest boundary of map; part of extensive field of similar basalt
			mm; larger crystals finely sieved), and aug (≤4 mm) in an intersertal to	porphyritic basaltic andesite (53.5% SiO2) lava flows erupted from vent 1.7	7 related brw. K-Ar age: 36±12 ka; 40Ar/39Ar plateau age: 35±4 ka. Samples	(HAOT; 48.5%, rarely to 50% SiO2) flows from vent marked by low cinder
			intergranular groundmass. Overlies units bh, ah, and dvb; overlain by mw.	km north of Red Cone, northwest of the caldera. Similar to lavas of unit br	but with abundant aug apparently contain inherited 40Ar and do not yield	mound 1.5 km east-southeast of Bald Crater (north of mapped area).
			Undated. Smooth contact of bwp tephra on dvb at caldera wall south of Devils	contains larger, sieved pl phenocrysts. Phenocrysts (15%; excluding abun-d	dant meaningful K-Ar ages	Phenocrysts (~5%): ol (≤ 2 mm, rarely 3 mm) and pl (≤ 2 mm) in an
			Backbone suggests similar age, or about 35 ka	pl microphenocrysts): ol (≤4 mm), aug (≤3 mm), and pl (≤3 mm; sieved) in	n an brp Pyroclastic (late Pleistocene) Light- to medium-gray porphyritic basaltic	intergranular groundmass; ol phenocrysts more abundant than pl.
			bwp Pyroclastic (late Pleistocene)Medium-gray porphyritic basaltic andesite	intergranular groundmass. Microxenoliths ($\leq 5 \text{ mm}$) of aug \pm ol \pm pl abunda	ant. andesite (52.5–54% SiO2) lava flows (br), bombs, and cinders (brp) erupted	Microxenoliths (≤5 mm) of ol + pl common. Undated but K-Ar and
			(51.5% SiO2) lava flow (bw) and grayish-red cinders (bwp) of Williams	Overlies unit br. Compositional and paleomagnetic data indicate brw lava	from vent marked by Red Cone and from fissure vent system 1.5 km north of	paleomagnetic data suggest similar in age to overlying unit br (40Ar/39Ar
			Crater complex (see also unit mw) west of the caldera. Formerly known as	represents part of the same ~35 ka eruptive episode as does unit hr	Red Cone, northwest of the caldera. Lava flowed to west-northwest around	plateau age 35±4 ka)
			Foronten Crater (Williams 1942) the cinder cone has been named in bonor	Recalific andesite of Red Come	source of unit arw to within \sim 1 km of Oscie Rutta. Unit is offset down to the	atc Andesite of Timber Crater (late or middle Plaisto-cono)
			of voloopologiet Louid Williams The Williams Caster constant in toto	br Java (lata Disistenana) Linkt to madium any antimitic baselii 1. 1	and by Dad Cone Chainer fault. Composition is server size bestline and the	sariata tayturad madium to dade assu andasita (50, 500) Isure I
			or vocanologist riower winnams. The winnams Crater complex includes	Lava (late r resource)Light- to medium-gray porphyriuc basaltic andesite	east by Keu Cone springs faunt. Composition is magne-stan basanic andesite,	senare-textured medium- to dark-gray andesite (56–59% StO2) lava flows and
			basaltic andesite contaminated with gabbro (resulting in bulk SiO2 content of	(52.5–54% SiO2) lava flows (br), bombs, and cinders (brp) erupted from ve	ent chemically primitive yet rich in incompatible trace elements. Olivine-phyric	summit cinder cone of Timber Crater shield volcano at north limit of map.
			a basalt), dacite, and hybrid andesite (Bacon, 1990). The basaltic andesite	marked by Red Cone and from fissure vent system 1.5 km north of Red Con	lavas of br represent the arc end member among primi-tive mafic lavas in the	Unit shown only on Bedrock Map (sheet 3) because it is covered by deposits
			comprises the cinder cone, a lava flow locally exposed from 1 to 4 km west of	northwest of the caldera. Lava flowed to west-northwest around source of u	unit Crater Lake region (Bacon and others, 1997a). Recognized in the field by	of climactic eruption within map area; description applies to lavas exposed
			the west base of the cone and possibly vented from a fissure, and enclaves	arw to within ~1 km of Oasis Butte. Unit is offset down to the east by Red	coarse, blocky olivine phenocrysts. Phenocrysts (5->20%; excluding	north of map area. Phe-nocrysts (~3–30%): ol (\leq 1 mm, rarely to 3 mm;
			within the dacite and hybrid andesite. Ubiquitous within the basaltic andesite	Cone Springs fault. Composition is magne-sian basaltic andesite, chemicall	ly abundant pl microphenocrysts): ol (≤5 mm), aug (≤4 mm), and pl (≤2 mm) in	commonly resorbed), pl (≤1 mm; commonly seri-ate; may show strong
			are gabbroic microxenoliths or aggregates (~2-10 mm) of various	primitive yet rich in incompatible trace elements. Olivine-phyric lavas of be	an intergranular groundmass. Phenocryst assemblages vary from ol only to ol	preferred orientation), minor aug (≤ 0.7 mm), with or without opx (≤ 0.7 mm)
			combinations of ol, pl, and aug. Phenocrysts (~30%, excluding seriate pl	represent the arc end member among primi-tive mafic lavas in the Crater La	ake + aug to ol + aug + pl, phenocryst content increasing in that order.	in a pilotaxitic to trachytic groundmass. Phenocryst-poor samples have ol and
		Disclaimer	microphenocrysts), many of which are derived from the grabbroic fragments:	region (Bacon and others, 1997a). Recognized in the field by coarse, blocky	y Microxenoliths (≤ 5 mm) of aug \pm ol \pm pl abundant in samples with those	pl; phenocryst-rich samples are dominated by pl and contain aug and more
		Annual of the de finne and a traction of the	ol (typically ≤3 mm, rarely to 6 mm), pl (typically ≤2.5 mm, commonly to 4	olivine phenocrysts. Phenocrysts (5->20%; excluding abundant pl	phases as phenocrysts. Overlies units bo, boe, and arw; overlain by closely-	abundant opx, while ol is strongly resorbed. Aggregates (≤ 3 mm) of ol \pm pl \pm

bwp

Pyroclastic









NCGMP09 geodatabase for the geologic map of Baranof Island, Southeast Alaska Evan Thoms, USGS, Anchorage, AK ethoms@usgs.gov

GeologicMap Feature Dataset

Digital Mapping Techniques Workshop 2015

Workflow

- 1) Converted ArcINFO coverages to ArcGIS 10.2 file geodatabase, mostly keeping intact the original National Surveys and Analysis (NSA) schema.
- 2) Edited lines and polygons with a lines-and-label-points-method, not through explicit topology class. A geoprocessing script automated the polygon feature class deletion, creation, and layer creation steps required for this method.
- 3) Moved data into NCGMP09 v1.1 schema and attributed the tables based on the Description of Map Units pamphlet, arccodes from the NSA schema, parsing of existing concatenated values, etc. LocationConfidenceMeters for all lines was determined by starting with, roughly, the thickness of a 'fault, certain' line on the map at the published scale (75 m) and doubling for each additional level of uncertainty, e.g. originally tagged 'approximate', 'concealed', or with query marks.
- 4) Scripted the discovery of unique values for all NCGMP09 controlled fields throughout the geodatabase and populated the Term field in the Glosssary. Created definitions or copied them in through joins with other dictionary-like tables, e.g, NCGMP09 General Lithology, although there are many instances of 'This study'.
- 5) Edited one metadata template xml file for the geodatabase as a whole. A geoprocessing script then exported FGDC metadata files for all data objects, migrated appropriate metadata elements to each metadata files, and wrote Entity Attribute Domain values for each NCGMP09 controlled field based on entries in the Glossary and DataSources.
- 6) Scripted the creation and assignment of domains based on controlled fields and Glossary entries. Scripted the creation of relationships. Used ArcGIS Diagrammer to create the object and relationship graphics seen here.
- 7) Mostly because of limited time, opted not to convert the cross section from Illustrator to ArcGIS.







GeologicMap_Topology

Karl, S.M., Haeussler, P.J., Zumsteg, C.L., Himmelberg, G.R., Layer, P.W., Friedman, R.M., Roeske, S.M., and Snee, L.W., 2015, Geologic map of Baranof Island, southeast Alaska: U.S. Geological Survey Scientific Investigations Map 3335, pamphlet 82p., http://dx.doi.org/10.3133/sim3335

Domains - created from values in _<field name>

and then assigned to the field

						Standalone tables				
ContactsAndFaults_Type Coded Value Domain	DescriptionOfMapUnits_MapUnit Coded Value Domain	DescriptionOfMapUnits_GeneralLithol Coded Value Domain	Confidence Coded Value Domain	GeologicLines_Type Coded Value Domain	OrientationPoints_Type Coded Value Domain					
right-lateral fault (right-lateral fault)	Qu (Qu)	Clastic sediment (Clastic sediment)	certain (certain)	metamorphic facies boundary (metamorp	foliation (foliation)		DescriptionOfMapUnits		Glossary	DataSources
map neatline (map neatline)	Qda (Qda)	Felsic-composition lava flows (Felsic-com	questionable (questionable)	scratch boundary (scratch boundary)	upright bedding (upright bedding)		Table		Table	Table
shoreline (shoreline)	Qafr (Qafr)	Felsic-composition pyroclastic flows (Felsi			overturned bedding (overturned bedding)		Fields		Fields	Fields
generic fault (generic fault)	Qafd (Qafd)	Felsic-composition air-fall tephra (Felsic-c	(This domain is assigned		lineation (lineation)		OBJECTID		OBJECTID	OBJECTID
left-lateral fault (left-lateral fault)	Qafa (Qafa)	Intermediate-composition air-fall tephra (to all ExistenceConfidence and				DescriptionOfMapUnits_ID		Glossary_ID	DataSources_ID
contact (contact)	Qafb (Qafb)	Mafic-composition air-fall tephra (Mafic-co	IdentityConfidence fields)				MapUnit		Term	Source
thrust fault (thrust fault)	Qafu (Qafu)	Pyroclastic flows (Pyroclastic flows)					Label	SourceID DataSources	Definition	Notes
ice contact (ice contact)	Qr (Qr)	Intermediate-composition lava flows (Intermediate-composition lava flows)					Name	Relationship	DefinitionSourceID	Indexes
normal fault (normal fault)	Qa (Qa)	Mafic-composition lava flows (Mafic-comp	GeochronPoints_AgeUnits	CMULines_Type	GeochronPoints_Type		FullName		Indexes	FDO_OBJECTID
	Qb (Qb)	Mostly sandstone, interbedded with other	Coded Value Domain	Coded Value Domain	Coded Value Domain		Age		FDO_OBJECTID	GDB_23_DataSources_ID
	Ts (Ts)	Mostly mudstone, interbedded with other	Ma (Ma)	horizontal bracket (horizontal bracket)	Ar-Ar (Ar-Ar)	DMUGeneralLithology_Glossary	Description		GDB_24_Term	
	ТКа (ТКа)	Sandstone (Sandstone)	ka (ka)	vertical bracket (vertical bracket)	K-Ar (K-Ar)	Relationship	GeneralLithology			
	ΤΚν (ΤΚν)	Metasedimentary rock (Metasedimentary	yr BP (yr BP)	left axis (left axis)	U-Pb, m (U-Pb, m)	DMUGeneralLithologyConfidence Glossary	GeneralLithologyConfidence		(All coded domain values are	
	Ks (Ks)	Slate and phyllite, of sedimentary rock or		age line (age line)	C14 (C14)	Relationship	HierarchyKey		defined in the Glossary)	
	Kss (Kss)	Schist and gneiss, of sedimentary rock or			U-Pb, d (U-Pb, d)		ParagraphStyle			
	Ksv (Ksv)	Marble (Marble)					Symbol			
	KJkk (KJkk)	Metaigneous rock (Metaigneous rock)					AreaFillRGB			
	KJks (KJks)	Metamorphic rock (Metamorphic rock)				SourceID DataSources	AreaFillPatternDescription			
	KJkv (KJkv)	Medium and high-grade regional metamo	CartographicLines_Type	DescriptionOfMapUnits_ParagraphSty	OtherPolys_Type	Relationship	DescriptionSourceID			
	Trp (Trp)	Coarse-grained, felsic-composition intrusi	Coded Value Domain	Coded Value Domain	Coded Value Domain		Indexes			
	Mzsc (Mzsc)	Coarse-grained, intermediate-composition	line of cross section (line of cross section	DMU-Heading1 (DMU-Heading1)	area of hornfels alteration (area of hornfe		FDO_OBJECTID			
	Mzgn (Mzgn)	Igneous and metamorphic rock (Igneous		DMU Unit 1 (DMU Unit 1)			MapUnit			
	Trm (Trm)	Coarse-grained, mafic-composition intrus		DMU-Heading3 (DMU-Heading3)			GeneralLithology			
	Trg (Trg)	Fine-grained, intermediate-composition ir		DMU Unit 1 (1st after heading) (DMU Uni						
	Trsv (Trsv)	Deformation-related metamorphic rock ([DMU Unit 2 (DMU Unit 2)						
	Pzsv (Pzsv)	Ultramafic intrusive igneous rock (Ultram		DMU-Heading2 (DMU-Heading2)						
	Pza (Pza)					Tin - $(MUP' + OB FCTID give)$	s vou a ManHnitPolys	ID of (MITER/, but you want (MITE	PNN84' Ilea this nythan avarassi	ion in the Field Calculator:
	Tif (Tif)						s you a mapoline olys			
	Togd (Togd)					'MUP' + str(!OBJECT	ID!).zfill(4)			
	Toet (Toet)									
	Toetm (Toetm)									
	Tegb (Tegb)							The second large second large second se		
	Tegd (Tegd)					IIP - XIVIL metadata resource	es: scripting - Element	iree python module, manual elem	ent inserting or deleting - XIVIL I	Notepad, manual element text editing and view-
	Tet (Tet)					ing - Notepad++, validating -	mp.exe (http://geology	v.usas.aov/tools/metadata/tools/d	oc/mp.html - faster than the Arc	GIS geoprocessing tools built on mn.exe)
	TMzs (TMzs)							,		
	Mzum (Mzum)									
	Kt (Kt)									
	Jt (Jt)			Disclaimer		Acknowledgements				
				Any use of trade fir	m or product names is	Kaith Lahay and Nora Show	(both USGS) originally	digitized into ArcINEO coverages	and attributed the man fea-	
	(bl) bl								and allibuled the map lea-	IIS Denartment of the Interior
	(This domain is assigned			for descriptive purp	oses only and does not	tures according to the Natior	nal Surveys and Analys	sıs schema.		
	to all MapUnit fields)			imply endorsement	hy the U.S. Government	-				Vovru2 leginologi 2 II
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