Geographic Information Systems (GIS) Compilation of Geophysical, Geologic, and Tectonic Data for the Circum-North Pacific

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SYSTEM REQUIREMENTS

The data and text on this CD-ROM require a computer and software able to read ESRI (Environmental Systems Research Institute) data formats. Appropriate software packages include ARC/INFO version 7.1.2 or higher, ArcView 3.1 or higher, and ArcExplorer. Full system requirements for each software package can be found at the Internet (Web) homepage for ESRI, http://www.esri.com. In order to run ArcView 3.1, a Windows computer is required with a Pentium processor with 24 Mb of RAM (32 Mb recommended). A Pentium-II or higher processor with a speed of at least at least 200 MHz is recommended for handling the large data files. All systems require a color monitor that can display at least 256 colors. This CD-ROM (OF99_422) was produced in accordance with the ISO 9660 Level 2 and Macintosh HFS standards. All ASCII text on this CD-ROM file can be accessed from DOS, Windows, Macintosh, and Unix computers.

USE OF GIS COMPILATION ON UNIX, MACINTOSH, AND DOS/WINDOWS COMPUTERS

Depending on system configuration and user needs, the data can be viewed directly from the CD-ROM, or the data can be downloaded onto a computer hard drive for viewing, manipulation, and plotting.

Unix

To mount this CD-ROM on a Unix-based computer, become the root user, then: *% su -* (not necessary for a Silicon Graphics workstation)

If a */cdrom* directory does not exist, create one:
 # cd/
#mkdir cdrom

Use the command appropriate to the UnixTM host:
DG AViiON: *mount -o noversion,ro -t cdrom /<dev> /cdrom*
DEC ALPHA: *mount -t cdfs -r -o nodefperm,noversion /<dev> /cdrom*
DECstation: *mount -t cdfs -r -o nodefperfm /<dev> /cdrom*
HP 700/8x7:   *mount -rt cdfs /<dev> /cdrom* (or use *sam*)
IBM RS/6000: *mount -v 'cdrfs' -p' ' -r' ' /<dev> /cdrom* (or use *smit*)
Silicon Graphics: *mount -o setx -t iso9660 /dev/ssi/<dev> /cdrom*
Sun Solaris 1.x: *mount -rt hsfs /<dev> /cdrom*
Sun Solaris 2.3:   use Volume Management software to mount and access the CD-ROM.

Sun Workstations running the Common Desktop Environment will auto-mount the CD-ROM.

Macintosh

ArcView 3.1 and ArcExplorer are not available for the Macintosh computer. The document, Adobe Acrobat PDF files, and readme files can be view, manipulated, and printed with a Macintosh computer. ArcView 3.0 for Macintosh can be used to create new ArcView project files.

DOS/Windows

To mount this CD-ROM on a DOS/Windows-based computer, insert the CD-ROM into a drive, and open the CD-ROM window. Follow the below instructions in the next section.

OPENING THE DATASETS AND EXAMPLES OF GIS COMPILATION

In the directory /norpac*/setup*, two ArcView projects (*norpac1.apr*, *norpac2.apr*) and one ArcExplorer project (*norpac.aep*) are provided to give users easy access to data on the CD-ROM. *norpac1.apr* requires that Spatial Analyst, an ArcView Extension which allows advanced manipulation and analysis of raster or point data (such as aeromagnetic, gravity, and earthquake data) compiled in ARC/INFO GRID format, be installed as well as ArcView 3.1. Use of *norpac2.apr* is designed for ArcView users who do not also have Spatial Analyst. Use of the ArcExplorer 1.1 project, norpac.aep, requires installation of the ArcExplorer program that is provided on the CD-ROM.

Use of GIS Compilation with ArcView 3.1

If ArcView 3.1 or higher is installed on your computer:

1. Place the CD-ROM in the CD Drive. Open the CD-ROM window.

2. Find the ArcView project *setup.apr* located in the */norpac/setup* directory.

3. Open the ArcView project by clicking on *setup.apr*, either from a file manager or from within ArcView.

4. ArcView should start with a small window with the title, "Cannot find the NorPac Data" followed by the sentence, "Enter the location of the NorPac Data". In the white box, replace "Drive Name" with the drive name and directory, "N:/norpac/" where "N" is the letter or name of the CD or hard drive. Next click "OK". A new window will appear with the title, "Found Spatial Analyst!" followed by the sentence, "Select a Project to load:" In the white box, select either "Norpac1.apr (Spatial Analyst)", if your computer has both ArcView 3.1 and Spatial Analyst installed, or select "Norpac2.apr (non-Spatial Analyst)", if your computer has only ArcView 3.1 installed. The selected ArcView project should load automatically. (Please note that if Spatial Analyst is not installed, Norpac2.apr will automatically load.) A window will appear with the title norpac1.apr or norpac2.apr, depending on the preceding selection. In the white box on the left side of the window will be a list of views that can be opened, viewed, manipulated, or printed within ArcView. Each view is a digital map of part of the GIS compilation. Each view has one or more themes (layers) that can be selected (made visible) or deselected (made invisible).

The views are:

Active Earth Example
Magnetic-Lithologic Correlation Example
Topographic Example
Cultural Features
Geology - Alaska
Geology - Russia
Gravity - DGRAV
Gravity - Geosat
Gravity - Seasurface
Magnetics - Alaska
Magnetics - Arctic
Magnetics - DNAG
Magnetics - East Asia
Magnetics - Russia
Reflection Profile Tracklines
Seismicity
Terranes - Alaska
Terranes - Canadian Cordillera
Terrames - Circum-North Pacific
Topography - Raster
Topography - Vector
Volcanoes - Active

A more detailed description of the views in given in the below section on Description of Views. Please note that if new themes and views are added to either *norpac1.apr* or to *norpac2.apr* and the ArcView project is saved, the ArcView project file needs to be edited before subsequent use of *setup.a*pr. Using a text editor such as WordPad, the path name *N:/*norpac/ (where N is the designator of the CD drive) in either *norpac1.apr* or *norpac2.apr* (as appropriate) will need to be replaced by *$norpac/.*

Use of GIS Compilation with ArcExplorer 1.1

If ArcExplorer is installed on your computer:

1. Place the CD-ROM in the CD Drive. Open the CD-ROM window.

2. Find the ArcView project "*norpac.aep"* located in the */norpac/setup* directory.

3. Copy the ArcExplorer project, "*norpac.aep"* into a directory on your hard drive. Deselect the Read-only box for the properties of this file. In order to accomplish this on a Windows computer, right-click on the file name and select "Properties".

4. Open the norpac.aep file in a word processor program, such as WordPad. Substitute the text string, D:\norpac\ with N:\norpac\ where "N" is the letter or name of the CD drive. Save the file as a text file with a new file name. Please note that a back slash ("\") is used in the substitution**.**

5. Start the ArcExplorer project by clicking on the new file name. The ArcExplorer project will start. In the gray box on the left side will be a list of pre-selected themes that can be opened (by selecting), viewed, and printed. Each theme is one part of the GIS compilation. Other themes can be added from the GIS compilation by referring to the below data descriptions. The themes consist of the basic ArcInfo files contained in the GIS compilation. The theme names and their "translated" names are:

THEME NAME	"TRANSLATED NAME"

Circum-North Pacific Terrane and Overlap Assemblage Map

BASINS.AAT	Mesozoic and Cenozoic basins for Circum-North Pacific terrane and overlap assemblage map
COAST.AAT	Coastline for Circum-North Pacific terrane and overlap assemblage map
FLTS_LND.AAT	Onshore (land) faults for Circum-North Pacific terrane and overlap assemblage map
FLTS_OCN.AAT	Offshore faults for Circum-North Pacific terrane and overlap assemblage map
FLTS_POS.AAT	Post-accretionary faults, onshore and offshore, for Circum-North Pacific terrane and overlap assemblage map
MAG_LINS.AAT	Magnetic lineaments for Circum-North Pacific terrane and overlap assemblage map
NOR_PAC.PAT	Topography for Circum-North Pacific terrane and overlap assemblage map
OCN_GEOL.AAT	Oceanic geology for Circum-North Pacific terrane and overlap assemblage map
RIVERS.AAT	River drainages from Circum-North Pacific terrane and overlap assemblage map.
TERR_LND.PAT1	Onshore terranes for Circum-North Pacific terrane and overlap assemblage map
TERR_OCN.PAT	Offshore terranes for Circum-North Pacific terrane and overlap assemblage map
SEA_MNTS.PAT	Seamounts for Circum-North Pacific terrane and overlap assemblage map

Geologic Map of Russian Far East

RUS_FLTS.AAT	Faults for geologic map of Russia
RUS_GEOL.PAT	Geologic units of Russian Far East
RUS_GEOL.PATIMPAC	Impactite areas for geologic map of Russia

Terrane and Geologic Maps of Alaska and Canadian Cordillera

AK_GEOL.PAT	Geologic map of Alaska
ASSEMBLG.PAT	Terrane and tectonic-assemblage maps of the Canadian Cordillera
TERR_LND.PAT	Detailed terrane map of Alaska at 1:2.5 M scale

Gravity and Magnetic Maps

AK_MAG (Image)	Magnetic map of Alaska (mainly onshore)
ARCT_MAG (Image)	Magnetic map of the Arctic (mainly offshore)
ASIA_MAG (Image)	Magnetic map of Far East Asia
DGRAV (Image)	Onshore Bouguer gravity anomalies and offshore free-air gravity anomalies for Alaska and adjacent offshore area
DNAG_MAG (Image)	Magnetic map of North America, onshore and offshore
GEOSAT (Image)	Satellite-derived free-air gravity fir offshore areas only.
RUSS_MAG (Image)	Magnetic map of Russia

SEA_SURF (Image)	Satellite-derived sea-surface heights

Seismicity

AK_SEIS.PAT	Seismicity for Alaska, 1888 to 1998
ISC_CAT.PAT	Global seismicity, 1964-1991

Topography and Bathymetry

AK_SHELF.PAT	Bathymetry for US waters shallower than 200 m, Beaufort Sea to the Aleutians
BER_CHUK.PAT	Bathymetry for Chukchi Sea and Bering Straits, US and Russian waters
CHUKCHI.PAT	Bathymetry for Chukchi Sea
ETOPO5 (Image)	*5'-sampled land topography and marine bathymetry.*
GTOPO2 (Image)	*2'-sampled land topography and marine bathymetry (only available to 70°N)*
GTOPO30 (Image)	30"-sampled topography (land only)

Cultural Features

BOUNDARY.PAT	International boundaries for Circum-North Pacific
CITIES.PAT	Major cities for Circum-North Pacific
FEATURES.PAT	Cultural features for Circum-North Pacific
LATLONG5.AAT	Latitude and longitude grid at 5 degree spacing for Circum-North Pacific
LATLON12.PAT	Latitude and longitude grid at 12° spacing for Circum-North Pacific

Tracklines

EW94_09.PAT	Ship trackline for geophysical cruise EW94-09
EW94_10.PAT	Ship trackline for geophysical cruise EW94-10

Please note that for the geologic and terrane maps, unique colors can be added to polygons (units) and lines (faults or contacts), and map unit abbreviations can be displayed. Please refer to the ArcExplorer documentation included on the CD.

ARCEXPLORER

ArcExplorer is a GIS-viewing freeware program created by and available from Environmental Systems Research Institute, Inc. (ESRI). The directory /norpac/setup/arcexplo contains installers for ArcExplorer 1.1 for Windows 95/98/NT. NT machines must have Service Pack 3 installed. In addition to viewing GIS data in ARC/INFO, ArcView, and other digital formats, ArcExplorer permits GIS data queries. ArcExplorer is currently only available for Windows computers (95, 98, or NT 4.0). ArcExplorer can access the GIS data contained in ARC/INFO 7.1.2 coverages on this CD-ROM. But because ArcExplorer can not display gridded datasets, images of these datasets are created as ****.bil* files which are displayed for the following datasets: (1) three raster topographic datasets (*/norpac/data/topogrfy/raster /etopo5*, */gtopo2* and */gtopo30);* (2) three gravity datasets (*/norpac/data/gravity/dgrav*, */geosat* and */sea-surf*); and (3) five magnetic datasets (*/norpac/data/magnetic/ak_mag*, */arct_mag*, */asia_mag*, */dnag_mag* and */russ_mag*). Please refer to the section below on "Contents and Description of /norpac/data".

PORTABLE DOCUMENT FORMAT (PDF) FILES

This publication makes use of Adobe Acrobat PDF files that are viewed with Adobe Acrobat Reader (versions 3.01 and 4.0 provided on this CD-ROM in the /norpac/setup/Acrobat folder). To make best use of this CD-ROM, you will need to develop some familiarity with Acrobat Reader; an on-line guide is available within Acrobat Reader under "Help." The Acrobat directory contains installers for Adobe Acrobat Reader 3.01 (ACROBAT3 subdirectory) and 4.0 (ACROBAT4 subdirectory) for both 32-bit Windows (PC directories) and Macintosh (MAC directories). Acrobat 3.01 will run on the minimum system requirements for this disc given above. To use Acrobat Reader 4.0 under Windows, you need an 80486 or Pentium processor-based personal computer, Microsoft Windows 95, Windows 98, or Windows NT 4.0 with Service Pack 3 or later, 8 MB of RAM on Windows 95 and Windows 98 (16 MB recommended), or 16 MB of RAM on Windows NT (24 MB recommended). To use Acrobat Reader 4.0 on a Macintosh, you need a Power Macintosh computer. This CD-ROM contains a full-text index (index.pdx and associated files in the "index" directory) that is for use in searching the PDF files for words or sets of words, using the search tool in Acrobat Reader. You can use the installers provided on this disc or download the latest version of Adobe Acrobat Reader free via the World Wide Web from the Adobe homepage at http://www.adobe.com/.

DOCUMENTATION

For more a detailed description of this CD-ROM, please refer to the included document file that is contained in the directory */norpac/readme* in Word 6 and PDF formats.

DIRECTORY ORGANIZATION

The */norpac* directory on this CD-ROM contains four directories, */data*, */readme*, and */setup* plus an */index* directory used by Acrobat Search. In all tables, directories, sub-directories and filenames are listed alphabetically. Please note, however, that the ArcView windows with the available views for the projects *norpac#.apr* are listed alphabetically by "theme name", as listed in the contents of */norpac/data*.

The directory */norpac/data* contains the GIS data in ARC/INFO 7.1.2 coverage and GRID formats. The directories under */norpac/data* are organized by data type in the following sub-directories: cultural; geology; gravity; magnetic; seismicity; shiptrax; terranes; topogrfy; and volcano. Each of these contains a sub-directory for each dataset which in turn contains all necessary files for use of the data with ESRI Arc software. All the vector datasets are presented as ARC/INFO coverages accessible by ArcView, ARC/INFO, and ArcExplorer. Because ARC/INFO GRID format files are not accessible by ArcExplorer, these datasets are represented as ***.bil images which can be opened in ArcExplorer. Sub-directories within geology and terranes also contain explanatory texts and figures, in ***.txt, ***.doc and ***.pdf formats, within sub-sub-directories called explanat. All data directories serve as ARC/INFO work spaces and include an ARC/INFO files.

The directory */norpac/data* contains two additional sub-directories. /norpac/data/examples contains example views of data compilations created from this CD-ROM, and additional shape files for new coverages created as part of these views. The directory */norpac/data/legends* contains suggested color tables and legends for different data-sets. The directories /examples and /legends are not ARC/INFO work-spaces and have no ARC/INFO files.

The directory */norpac/readme* contains information files for this CD-ROM in multiple file formats, text (***.txt), Word (***.doc), Rich-Text Format (***.rtf), and portable document format (***.pdf). (***.pdf files can be read with Adobe Acrobat Reader 4.0, freeware contained in */norpac/setup/Acrobat*). The various files named readme.*** (this file) contain brief information about this CD-ROM. The various files named document.*** contain full documentation for all data-sets on this CD-ROM. The directory */norpac/readme/cpyright* contains copyright notices associated with multiple-generation data.

CONTENTS AND DESCRIPTION OF /norpac/setup

The directory */norpac/setup* contains project files for use with ArcView, norpac1.apr (for users with Spatial Analyst installed), norpac2.apr (for users without Spatial Analyst), and the ArcExplorer file norpac.aep (for users without ArcView). The */norpac/setup* directory also contains: (1) in the directory */norpac/setup /arcexplo*, installation files for ArcExplorer 1.1, the free data-viewing software for users of this CD-ROM who do not have either ArcView or ARC/INFO software; and (2) in the directory */norpac/setup/Acrobat*, installers for Adobe Acrobat Reader 3.01 and 4.0 for both Windows 95/98/NT and Macintosh. The latest version of Adobe Acrobat Reader can also be downloaded free via the Internet from the Adobe homepage on the World Wide Web at http://www.adobe.com.

CONTENTS AND DESCRIPTION OF /norpac/data

Listing of data-sets

Directory   filename   Brief description of data, Key reference

Directory	filename	Brief description of data, Key reference
cultural	boundary	International, provincial and state boundaries
	cities	Significant population centers
	features	Other socio-cultural features
	latlong5	Latitude and longitude grid at 5° spacing
	latlon12	Latitude and longitude grid at 12° spacing
	references:	Various (refer to detailed tabular description in documentation)
examples		Example views of multiple layers from this GIS compilation
geology	ak_geol	Geologic map of Alaska
	reference:	Beikman (1980)
	rus_flts	Fault map of Russia
	rus_geol	Geologic map of Russia
	reference:	Nalivkin (1994); GlavNIVC (1998).
gravity	dgrav	Onshore Bouguer and offshore free-air gravity anomalies
	reference:	Hittelman and others (1994)
	geosat	Satellite-derived free-air gravity, offshore areas only
	reference:	Smith and Sandwell (1997)
	sea_surf	Satellite-derived sea-surface heights
	reference:	Hittelman and others (1994)
legends		color-bars and contour information for each data-set

magnetic	ak_mag	Magnetic map of Alaska (largely onshore)	
	reference:	Saltus and Simmons (1997)	
	arct_mag	Magnetic map of the Arctic (largely offshore)	
	reference:	Verhoef and others (1996); Macnab and others (1995)	
	asia_mag	Magnetic map of Far East Asia	
	reference:	Geological Survey of Japan and CCOP (1996)	
	dnag_mag	Magnetic map of North America, onshore and offshore	
	reference:	Hittelman and others (1989)	
	russ_mag	Magnetic map of Russia	
	reference:	Racey and others (1996)	
seismcty	isc_cat	Catalog of global seismicity, 1964-1991	
	reference:	Whiteside and others (1996)	
	ak_seis	Alaska State Seismicity, 1898-1998	
	reference:	Hansen and others (1999)	
shiptrax	ew94_09	Ship trackline for geophysical cruise EW94-09	
	ew94_10	Ship trackline for geophysical cruise EW94-10	
	reference:	Bering-Chukchi Working Group (1999)	
terranes	alaska	explanat	Map explanation
		terr_lnd	Detailed terrane map of Alaska only
		reference:	Nokleberg and others (1994b)
	canada	assemblg	Tectonic assemblages of Canadian Cordillera
		reference:	Journeay and Williams (1995)
	nor_pac	nor_pac	Circum-North Pacific Terrane Map
		basins	Outlines of Mesozoic and Cenozoic basins
		coast	Coastline
		explanat	assemb (text files for assemblage descriptions)
			columns (stratigraphic columns)
			terranes (text files for terrane descriptions)
			mapexpln.pdf (map explanation)
		flts_lnd	Onshore faults
		flts_ocn	Offshore faults
		flts_pos	Post-accretionary faults
		mag_lins	Magnetic lineaments
		ocn_geol	Oceanic geology
		sea_mnts	Seamounts
		terr_lnd	Onshore terranes
		terr_ocn	Offshore terranes
		reference:	Nokleberg and others (1994a)
topogrfy	raster	Contains gridded topographic data	
		etopo5	5'-sampled land topography and marine bathymetry
		reference	Hittelman and others (1994); NOAA (1988)
		gtopo2	2'-sampled land topography and marine bathymetry
		reference	Smith and Sandwell (1997)
		gtopo30	30"-sampled topography (land only)
		reference:	U.S. Geological Survey (1997)
		hillshad	30"-sampled topography
		reference	GTOPO30: U.S. Geological Survey (1997)
		etopo2	2'-sampled topography/bathymetry (to 70°N)
		reference:	Smith and Sandwell (1997)

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                    etopo5      5'-sampled topography/bathymetry
                    reference:  Hittelman and others (1994); NOAA (1988)
          vector    Contains contours (elevation or bathymetry)
                    ak_shelf    Bathymetry for US waters shallower than 200m
                    ber_chuk    Bathymetry for Bering and Chukchi Seas
                    chukchi     Bathymetry for Chukchi Sea/Bering Straits
                    reference:  Alaska Biological Science Center (1998)
                    nor_pac     Circum-North Pacific topography and bathymetry
                    reference   Moore (1990)
                    shorline    World Vector Shoreline
                    reference:  Soluri and Woodson (1990)
                    nor_pac     Circum-North Pacific topography/bathymetry
                    rivers      Major drainages, circum-North Pacific
                    reference:  Moore (1990)
volcano   volcano   Historically active volcanoes
                    reference:  Simkin and others (1994)
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ASSOCIATED STUDIES

This GIS compilation on this CD-ROM is part of a project on the major mineral deposits, metallogenesis, and tectonics of the Russian Far East, Alaska, and the Canadian Cordillera. The project provides critical information for collaborators and customers on bedrock geology and geophysics, tectonics, major metalliferous mineral resources, metallogenic patterns, and crustal origin and evolution of mineralizing systems for the Russian Far East, Alaska, and the Canadian Cordillera.

The major scientific goals and benefits of the project are to: (1) provide a comprehensive international data base on the mineral resources of the region that is the first, extensive knowledge available in English; (2) provide major new interpretations of the origin and crustal evolution of mineralizing systems and their host rocks, thereby enabling enhanced, broad-scale tectonic reconstructions and interpretations; and (3) promote trade and scientific and technical exchanges between North America and Eastern Asia. Products from the project are providing sound scientific data and interpretations for commercial firms, governmental agencies, universities, and individuals that are developing new ventures and studies in the project area, and for land-use planning studies that deal with mineral resource issues. The Russian Far East part of the project (as well as Alaska and the Canadian Cordillera) has vast potential for known and undiscovered mineral deposits.

Published major companion studies for the project are: (1) a report on the metallogenesis of mainland Alaska and the Russian Northeast (Nokleberg and others, 1993); (2) a tectono-stratigraphic terrane map of the Circum-North Pacific at 1:5 million scale with a detailed explanation of map units and stratigraphic columns (Nokleberg and others, 1994b); (3) a tectono-stratigraphic terrane map of Alaska at 1:2.5 million scale (Nokleberg and others, 1994a); (4) a summary terrane map of the Circum-North Pacific at 1:10 million scale (Nokleberg and others, 1997a); (5) detailed tables of mineral deposits and placer districts for the Russian Far East, Alaska, and the Canadian Cordillera in paper format (Nokleberg and others, 1996) and in CD-ROM format (Nokleberg and others, 1997b); (6) a GIS presentation of a summary terrane map, mineral deposit maps, and metallogenic belt maps of the Russian Far East, Alaska, and the Canadian Cordillera (Nokleberg and others, 1998b); and (7) a study of the Phanerozoic tectonic evolution of the Circum-North Pacific (Nokleberg and others, 1998a).

ACKNOWLEDGMENTS

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