Kansas Geological Survey
Open-file Report

Disclaimer

The Kansas Geological Survey does not guarantee this document to be free from errors or inaccuracies and disclaims any responsibility or liability for interpretations based on data used in the production of this document or decisions based thereon. This report is intended to make results of research available at the earliest possible date, but is not intended to constitute final or formal publication.

User's Manual for Digital Chart of the World 1 Quadrangles

Gregory W Pouch
Geohydrology Section
Kansas Geological Survey

Abstract

A series of electronic maps in WHEAT format was prepared from the Digital Chart of the World, a set of 1:1,000,000 electronic maps based on the Defense Mapping Agency's Operational Navigational Charts.. Each full-quadrangle electronic map covers a 5° by 5° quadrangle containing all the data available in the original Digital Chart of the World, code look-up tables, and a set of prepared themes and other tables to allow immediate use in WHEAT EMAPKGS2. Data layers include borders, hydrology, towns, elevation contours, roads, railroads, airports, and utilities, as well as several more miscellaneous themes. Maps at this scale are particularly well-suited for mapping areas of 20 kilometers to 1000 kilometers.

Coordinate data are in the geographic angular system in decimal degrees (longitude-latitude). The horizontal datum is the World Geodetic System 1984 (WGS84). Feature locations are accurate to approximately 2 kilometers.

Table of Contents

Last Modified by Greg Pouch, 01/08/97 11:36 AM

Overview

This manual describes a series of small-scale – 1:1,000,000 scale – electronic maps derived from the US Defense Mapping Agency's Digital Chart of the World (DCW), Version 1 (See DMA 1992). The DCW was digitized from the Defense Mapping Agency (DMA) Operational Navigational Charts, primarily intended for air navigation and military planning. Among the civilian uses of base maps at this scale are geologic reconnaissance mapping, resource management, disaster/famine relief, expedition/travel, social science and logistics. The level of detail is much higher than a typical (United States) state map and somewhat less detailed than a county map.

Each standard electronic map covers a 5° by 5° quadrangle containing all the data available in the original Digital Chart of the World, code look-up tables, and a set of prepared themes and other tables to allow immediate use in WHEAT EMAPKGS2 (Pouch, 1994, 1996a-d). (To get WHEAT, use the World Wide Web to get to www.kgs.ukans.edu, choose Kansas Geological Survey, then Software, then WHEAT, or try going directly to http://crude2.kgs.ukans.edu/software/Wheat/whtmain.htm.) The user can modify these themes or design new ones to tailor the map for particular purposes. Loading all the pre-designed themes produces a cluttered map; eliminating town symbols and labels and spot elevation symbols and labels produces a much more readable map.

Each standard quadrangle is in a separate Microsoft Access MDB format database stored in a pkZip file of the same name. Typical quadrangle sizes are 500 to 1500 KByte compressed and 1 to 3 MByte uncompressed. In addition to the full-quadrangle electronic maps, there are several spliced regions, such as Kansas, USA (KSDCW01.MDB) and Pernambuco, Brazil, (BRPERN01.MDB) as well as partial maps, such as some partial quadrangles in northern Mexico. The quadrangles imported cover most of the Third World and Kansas. These data are available on the KGS World Wide Server. At time of publication, the URL was ftp://crude2.kgs.ukans.edu/pub/wheat/datasets/dcw/ .

Purpose

These portions of the Digital Chart of the World database were imported for several purposes: to aid natural resource exploitation and management in the Third World for basic needs development, to provide maps suitable for relief work in the Third World, and to provide example datasets for use with WHEAT. It is hoped that providing regional topographic maps in an easy-to-use format will facilitate groundwater exploration, agronomic planning, and the logistics of relief projects.

Data

There are three categories of electronic maps in this collection: standard quadrangles, partial quadrangles, and spliced regions. Standard quadrangles are simple imports of the original 5° by 5° quadrangles found in the DCW: they have names like FJ22 that indicate their location. Partial quadrangles are substantially the same as standard

quadrangles, except that parts have been discarded: they have names like FJ32W for some Western portion of FJ32. Spliced regions consist of data from one or more quadrangles and may also be trimmed to produce a map of some area of special interest to the author, such as Kansas, USA and Pernambuco, Brazil: they are named after the geographic region of interest.

Any errors in the original DCW data propagated into the quadrangle maps. Additional errors due to problems importing the files may have occurred. Polygons with more than 4096 points on their perimeters failed to build properly, but the topological data necessary to build them (polygon IDs of the bordering polygons) has been included in the databases as fields with names like DNAREA_AFT_IDTORIGHT and DNAREA_AFT_IDTOLEFT in the DRAINAGELINES table. Defective polygons are marked with a value of TRUE in column ISDEFECTIVE in the polygons table.

COORDINATES

For standard and partial quadrangles, coordinate data are in the geographic angular system in decimal degrees (longitude-latitude). The horizontal datum is the World Geodetic System 1984 (WGS84); the WGS84 ellipsoid corresponds to the Geodetic Reference System 80 (GRS80) ellipsoid. Feature locations are accurate to approximately 2 kilometers. As stated on the DMA's web site :

> Features: The absolute horizontal accuracy of the DCW for all features derived from Operational Navigation Charts (ONCs) is 2040 meters (6700 feet) rounded to the nearest 5 meters at 90% Circular Error (CE), World Geodetic System (WGS84). The accuracy of spot elevations collected from ONC source is 30 meters (100 feet). The accuracy requirements do not apply to feature symbols that are displaced as identified in MIL-STD-600001.
>
> (DMA's DCW page is http://164.214.2.53/publications/guides/dtf/dcw.html)

For spliced regions, coordinates will usually be in Universal Transverse Mercator coordinates in meters, with the zone number being that of the central part of the region if the region does not fit into one zone: the table ztblWHEAT_LOG will contain notes on any coordinate transformations or additional processing.

LAYERS

Most of the standard layers on a small-scale map are included in the databases. For almost all quadrangles, these includes borders, major hydrology, elevation contours and spot elevations, towns, major roads, airports, and major utility lines. Other layers are found only in some quadrangles. These include cultural landmarks, ocean features, physiography and land cover, and railroads. Which layer a particular feature is found in seems to be somewhat arbitrary: it is often necessary to examine several layers to find a feature.

Each layer may be split into as many as four different tables, based on geometric type. The geometric type is appended to the layer name to form the table name. Thus, areas in the borders coverage are found in the table BORDERSPOLYGONS, border lines and coastlines are found in BORDERSLINES, small ocean islands are found in BORDERSPOINTS, and border text can be found in BORDERS_TEXT_RAW.

In addition to the main data tables, there are "decoder" tables explaining the various type and status codes. These were left as separate tables to keep database size down and to permit easy translation.

Table 1 Layers in the Digital Chart of the World Quadrangles.

WHEAT Name	Description	DCW Name	DCW prefix
Borders	Shorelines, international borders, some intra-national borders	Political/Oceans	PO
Drainage	Major rivers and lakes	Drainage	DN
Drainage Supplemental	Small lakes and islands	Drainage Supplemental	DS
Contours	Elevation contours and spot elevations	Hypsography & Hypsography Supplemental	HY & HS
Towns	Towns, cities, and built-up areas	Populated Places	PP
Roads	Major roads	Roads	RD
Transportation Structures	Bridges, tunnels, and other such features	Transportation Structures	TS
Railroads	Major railroads	Railroads	RR
Utilities	Major utilities	Utilities	UT
Airports		Airports	AE
Cultural Landmarks		Cultural Landmarks	CL
Physiography	Cliffs, outcrops, bluffs, levees ...	Physiography	PH
LandCover	Special cover types like swamps, mines, oil fields ...	LandCover	LC
OceanFeatures	Reefs and shipwrecks	Ocean Features	OF

Suggestions for Further Processing

This set of databases consists of around 400 standard quadrangles that were imported in "batch" mode. No attempt was made to customize the databases, and many features that would be useful were left out in order to reduce size and decrease transmission times and costs. Accordingly, there are many modifications that you, the end user, should make to a database before using. Most of these can be performed easily if you have WHEAT, which is free , and Microsoft Access. It is necessary to learn the basics of table design and query design in MSAccess in order to perform most of these operations.

Activity	Purpose and Directions	Program
Add indexes	Although all the tables contain a field suitable for use as a primary key, most tables do not have a primary key defined. (The indexes were not added so as to reduce size and improve import speed.) In each table, find a field with a name that ends in _xFT_ID (where x can be A, L, P, or T) and make it the primary key	MSAccess
Project to UTM	The coordinates are usually Longitude-Latitude. Except at the Equator, a degree of longitude is a different size from a degree of latitude, so to get "correct" shapes and meaningful spatial queries, it is necessary to use some cartesian coordinate system for the map coordinates. Using WHTGCTP1 or one of the other WHEAT projection programs, convert coordinates to a cartesian coordinate system widely used in the area of interest. Choose a coordinate system that has tic marks or grid lines on commonly available maps. Usually, the best coordinate system will be UTM (Universal Transverse Mercator).	WHTGCTP1 or LLUTMN_
Eliminate duplicate points	The import process splices short chains together to form polygon perimeters, without eliminating duplicated points at the ends. Eliminating these saves space and reduces the risk of errors in distance calculations. CHNMASSG will automatically eliminate these duplicates for any XYChain field it processes.	CHNMASSG
Extract points for text	The DCW gives most text a shape line (curved line that the text should follow). WHEAT cannot use this. In order to display text, you should first convert the XYChains into loose points, and write a query that links the loose points to the text string. Then you can display the text using that query. It may help to eliminate all but the first point.	BLOB2PTS and MSAccess
Add themes	Because they don't occur in all quadrangles or were not of interest to the author, no themes were pre-defined for LandCover, Physiography, TransportationStructures, Utilities, xCulturalFeatures. Define new themes for them, if you want	EMAPKGS2 or THEMEDIT

Activity	Purpose and Directions	Program
Splice databases	Since field areas invariably cross quadrangle boundaries, no matter how big the field area or the quadrangle, you will probably want to splice two or more quadrangles together.	DBSplice *In progress*
Splice features	In the original DCW, features are cut at quadrangles boundaries. You can use the GLUTEN program to splice features together based on some field being identical.	GLUTEN *In progress*
Find centroids of polygons	It is often useful to label polygons, which requires a point location. CHNMASSG can calculate centroids of polygons. You can also calculate the area, perimeter, and a boundbox of the XYChain using CHNMASSG.	CHNMASSG
Repair damaged polygons	Some polygons failed to build properly, but the topological data necessary to build them (polygon IDs of the bordering polygons) has been included in the databases as fields with names like DNAREA_AFT_IDToRight. You can (somehow) splice these together. It is probably best to identify a series of XYChains to splice together using interactive spatial queries in EMAPKGS2 then use GLUTEN to splice them together.	EMAPKGS2, MSAccess, and GLUTEN
Eliminate queries that don't return results	Sometimes, there are no features in a particular Layer-GeometricType combination, even though a query to retrieve them and possibly a theme are defined. Using MSAccess, open each query, and if it returns an empty result set or causes an error, delete it. Delete any themes based on a bad query.	MSAccess

Disclaimer

These databases may and probably do contain errors. USE AT YOUR OWN RISK. The Kansas Geological Survey, University of Kansas, DOES NOT PROVIDE FREE TECHNICAL SUPPORT for using these databases.

You may freely re-distribute this database at no profit as long as you include this disclaimer and inform any recipient that the data is available for free.

The database structure, database software, and processing software described in this document are the work of the Kansas Geological Survey, University of Kansas. The Kansas Geological Survey, University of Kansas, makes no warranty or representation, either express or implied, with respect to the database, documentation or interpretations or decisions based on data processed using this software, including their quality, performance, merchantability, or fitness for a particular purpose. In no event will the Kansas Geological Survey, University of Kansas, be liable for direct, indirect, special, incidental, punitive, or consequential damages arising out of the use of or inability to use

the database or documentation whether based upon contract, negligence, strict liability or otherwise.

The information in this database was retrieved from the U.S. Defense Mapping Agency's (DMA) Digital Chart of the World, version 1. The data was then processed at the Kansas Geological Survey, University of Kansas. The DMA did not, does not, and will not guarantee the accuracy and completeness of this data. The Kansas Geological Survey, University of Kansas, does not and will not guarantee the accuracy of this data. This product is based on provisional data made available solely for the convenience of interested researchers with the understanding that it is provisional, unchecked and that the user will not hold the DMA or the KGS liable in any way for the accuracy or completeness of this data.

The data in this database is provisional data and unchecked. The data in this database may, and almost certainly does, contain errors, both in the original data and in the process of importing it into this database. The Kansas Geological Survey, University of Kansas, does not warrant that the database will meet your requirements, that it will operate in an error free manner, or that it contains accurate and complete data.

If you use this software and database, you are accepting the terms of this disclaimer (i.e., use at your own risk.). If you do not or cannot agree to these terms, return the software and database immediately.

UNDER NO CIRCUMSTANCES SHOULD YOU RE-DISTRIBUTE THIS DATA OR THIS SOFTWARE APART FROM THIS DISCLAIMER.

Magnifying a 1:1,000,000 map to 1:100,000 increases its size, not its data content or accuracy. Do not be surprised by horizontal mis-locations of the order of several kilometers, particularly for features of military significance.

Distribution

These databases are in the public domain (free) and may be freely re-distributed as long as all the disclaimers are included and proper credit for creation of the database is given. If you re-distribute this data, you must give the recipient copies of all the disclaimers and indicate that the database was free and explain how to obtain it.

Acknowledgments

I would like to thank my fiancée, Becky Roesner, for putting up with me while I was preparing these maps; Steve Yoder, Jinwu Ma, and the DASC staff for alerting me to and helping me find and duplicate the Digital Chart of the World CDs; Marios Sophocleous for his support while I was working on these maps; and Fathers Phil Bauer, M.M., Walter Conlan, S.J., and Bob Brungs, S.J. for providing much of the original impetus for preparing these maps and designing a GIS for use in international development.

This project was undertaken while at the Kansas Geological Survey. It was not supported with State of Kansas funds.

References

DMA (Defense Mapping Agency), 1992, Military Specification for the Digital Chart of the World (DCW), MIL-D-89009, Defense Mapping Agency, 204p.

Pouch, Gregory W., 1994, User's Guide to WHEAT : the Windows-based Hydrogeologic Exploration and Analysis Toolkit, Open File Report 94-51, Kansas Geological Survey, 28 p.

Pouch, Gregory W., 1995, Source code WHEAT EMAPKGS2 2.0, Open File Report 95-65, Kansas Geological Survey, 678 p.

Pouch, Gregory W., 1996a, How to Use WHEAT Electronic Mapper 2.0: EMAPKGS2, Open File Report 95-64, Kansas Geological Survey, 10 p.

Pouch, Gregory W., 1996b, User's Manual for WHTGCTP1: A User-Friendly Map-Coordinate Projection Program, Open File Report 95-14, Kansas Geological Survey, 38 p.

Pouch, Gregory W., 1996c, Source Code for WHTGCTP: WHEAT General Cartographic Transformation Package Program, Open File Report 95-15, Kansas Geological Survey, 5 p.

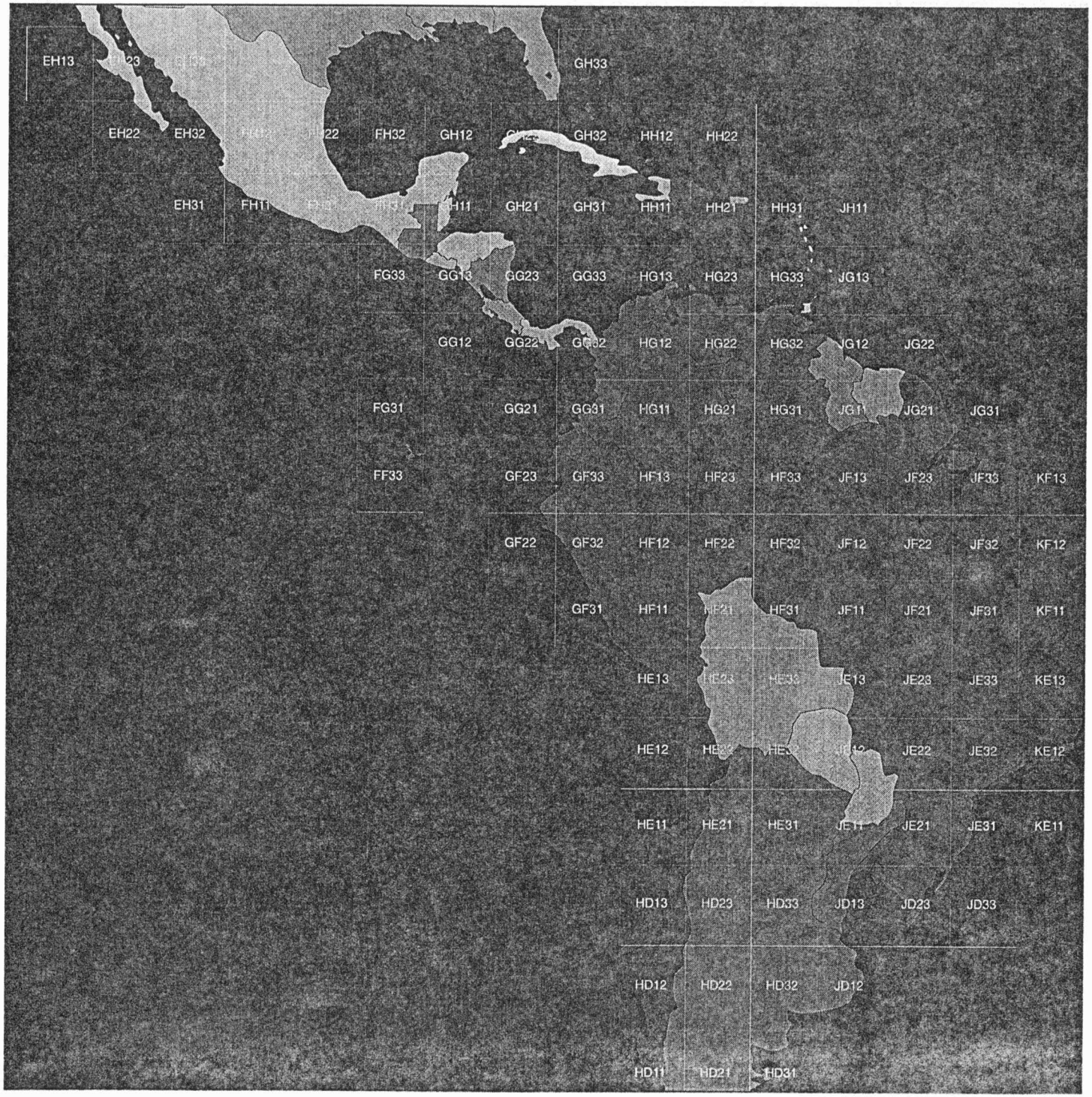
Pouch, Gregory W., 1996d, WHEAT Software Development Toolkit, Open File Report 96-12, Kansas Geological Survey, 38 p.

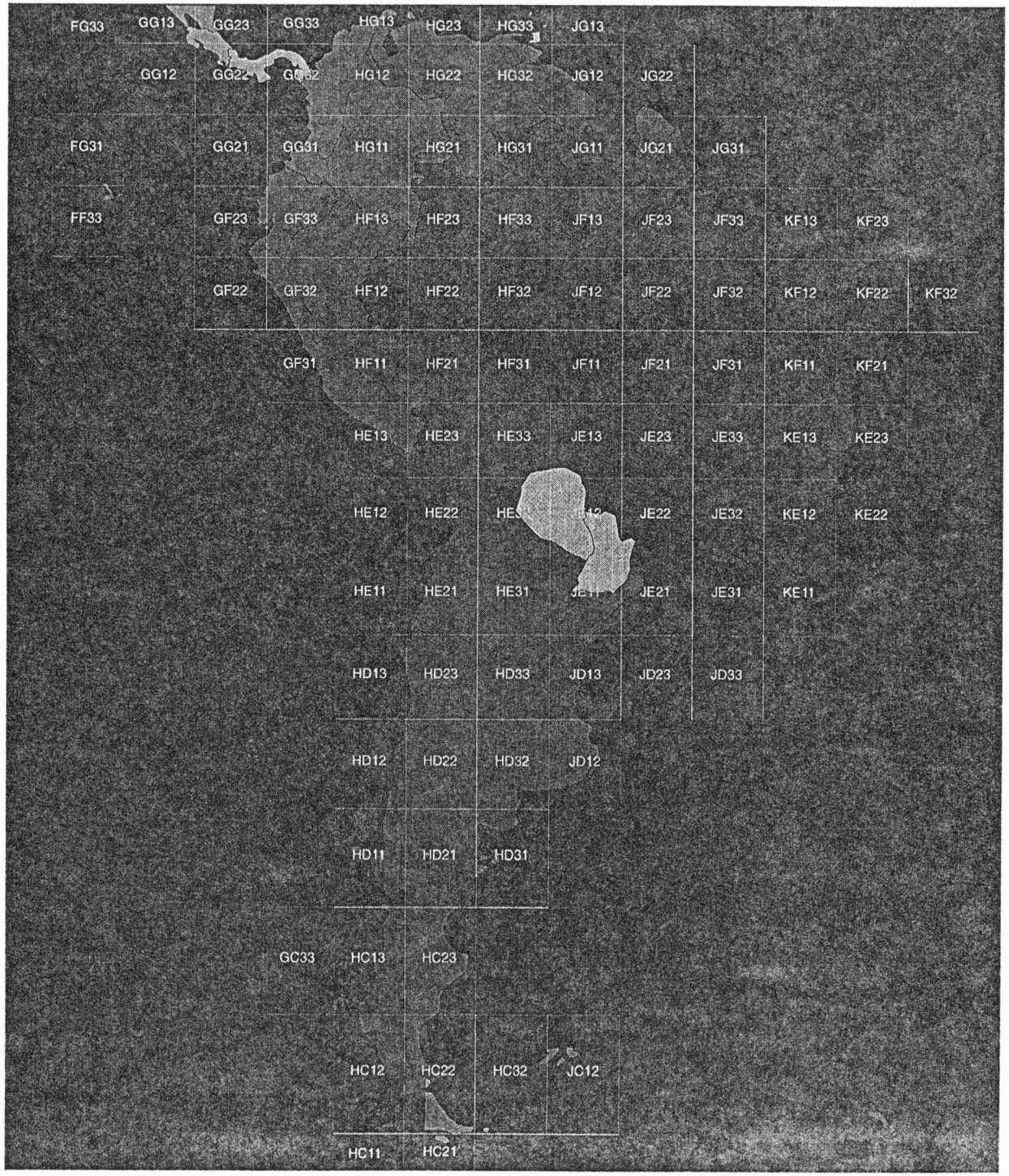
Appendix 1 Quadrangles Imported as of 9 July 1996

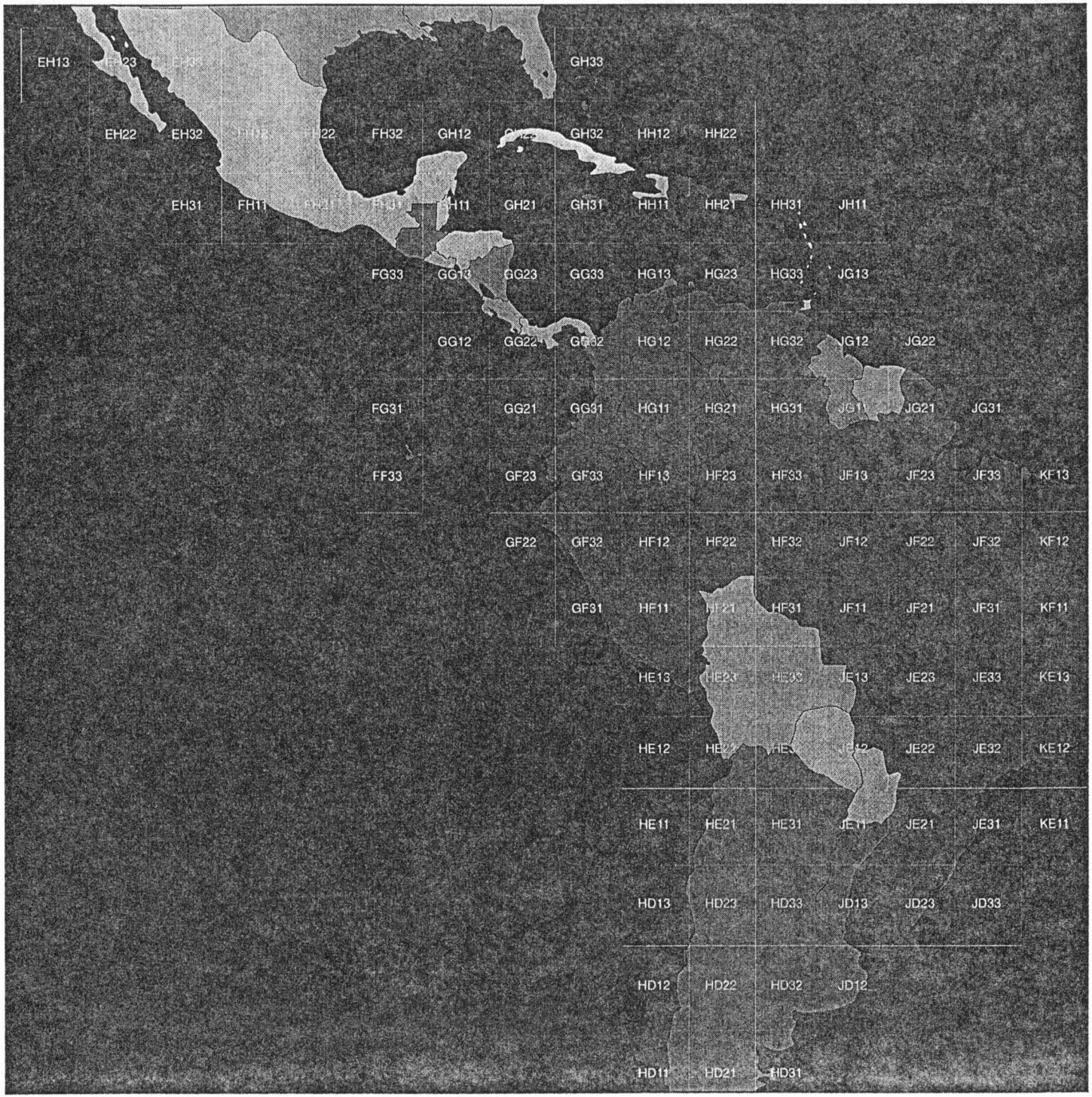
Name	Min Longitude X	Min Latitude Y	Max Longitude X	Max Latitude Y
EH13	-120	25	-115	30
EH22	-115	20	-110	25
EH23	-115	25	-110	30
EH31	-110	15	-105	20
EH32	-110	20	-105	25
EH33	-110	25	-105	30
FH11	-105	15	-100	20
FH12	-105	20	-100	25
FH21	-100	15	-95	20
FH22	-100	20	-95	25
FF33	-95	-5	-90	0
FG31	-95	0	-90	5
FG33	-95	10	-90	15
FH31	-95	15	-90	20
FH32	-95	20	-90	25
GG12	-90	5	-85	10
GG13	-90	10	-85	15
GH11	-90	15	-85	20
GH12	-90	20	-85	25
GF22	-85	-10	-80	-5
GF23	-85	-5	-80	0
GG21	-85	0	-80	5
GG22	-85	5	-80	10
GG23	-85	10	-80	15
GH21	-85	15	-80	20
GH22	-85	20	-80	25
GC33	-80	-50	-75	-45
GF31	-80	-15	-75	-10
GF32	-80	-10	-75	-5
GF33	-80	-5	-75	0
GG31	-80	0	-75	5
GG32	-80	5	-75	10
GG33	-80	10	-75	15
GH31	-80	15	-75	20
GH32	-80	20	-75	25
GH33	-80	25	-75	30
HC11	-75	-60	-70	-55
HC12	-75	-55	-70	-50
HC13	-75	-50	-70	-45
HD11	-75	-45	-70	-40
HD12	-75	-40	-70	-35
HD13	-75	-35	-70	-30
HE11	-75	-30	-70	-25
HE12	-75	-25	-70	-20
HE13	-75	-20	-70	-15
HF11	-75	-15	-70	-10
HF12	-75	-10	-70	-5
HF13	-75	-5	-70	0
HG11	-75	0	-70	5
HG12	-75	5	-70	10
HG13	-75	10	-70	15
HH11	-75	15	-70	20
HH12	-75	20	-70	25
HC21	-70	-60	-65	-55
HC22	-70	-55	-65	-50
HC23	-70	-50	-65	-45
HD21	-70	-45	-65	-40
HD22	-70	-40	-65	-35
HD23	-70	-35	-65	-30
HE21	-70	-30	-65	-25
HE22	-70	-25	-65	-20
HE23	-70	-20	-65	-15
HF21	-70	-15	-65	-10
HF22	-70	-10	-65	-5
HF23	-70	-5	-65	0
HG21	-70	0	-65	5
HG22	-70	5	-65	10
HG23	-70	10	-65	15
HH21	-70	15	-65	20
HH22	-70	20	-65	25
HC32	-65	-55	-60	-50
HD31	-65	-45	-60	-40
HD32	-65	-40	-60	-35
HD33	-65	-35	-60	-30
HE31	-65	-30	-60	-25
HE32	-65	-25	-60	-20
HE33	-65	-20	-60	-15
HF31	-65	-15	-60	-10
HF32	-65	-10	-60	-5
HF33	-65	-5	-60	0
HG31	-65	0	-60	5
HG32	-65	5	-60	10
HG33	-65	10	-60	15
HH31	-65	15	-60	20
JC12	-60	-55	-55	-50
JD12	-60	-40	-55	-35
JD13	-60	-35	-55	-30
JE11	-60	-30	-55	-25
JE12	-60	-25	-55	-20
JE13	-60	-20	-55	-15
JF11	-60	-15	-55	-10
JF12	-60	-10	-55	-5
JF13	-60	-5	-55	0
JG11	-60	0	-55	5
JG12	-60	5	-55	10
JG13	-60	10	-55	15
JH11	-60	15	-55	20
JD23	-55	-35	-50	-30
JE21	-55	-30	-50	-25
JE22	-55	-25	-50	-20
JE23	-55	-20	-50	-15
JF21	-55	-15	-50	-10
JF22	-55	-10	-50	-5
JF23	-55	-5	-50	0
JG21	-55	0	-50	5
JG22	-55	5	-50	10
JD33	-50	-35	-45	-30
JE31	-50	-30	-45	-25
JE32	-50	-25	-45	-20
JE33	-50	-20	-45	-15
JF31	-50	-15	-45	-10
JF32	-50	-10	-45	-5
JF33	-50	-5	-45	0
JG31	-50	0	-45	5
KE11	-45	-30	-40	-25
KE12	-45	-25	-40	-20
KE13	-45	-20	-40	-15
KF11	-45	-15	-40	-10
KF12	-45	-10	-40	-5
KF13	-45	-5	-40	0
KE22	-40	-25	-35	-20
KE23	-40	-20	-35	-15
KF21	-40	-15	-35	-10
KF22	-40	-10	-35	-5
KF23	-40	-5	-35	0
KF32	-35	-10	-30	-5
LH11	-30	15	-25	20
LG23	-25	10	-20	15
LH21	-25	15	-20	20
LH22	-25	20	-20	25
LG33	-20	10	-15	15
LH31	-20	15	-15	20
LH32	-20	20	-15	25
LH33	-20	25	-15	30
LJ31	-20	30	-15	35
MG12	-15	5	-10	10
MG13	-15	10	-10	15
MH11	-15	15	-10	20
MH12	-15	20	-10	25
MH13	-15	25	-10	30
MJ11	-15	30	-10	35
MG21	-10	0	-5	5
MG22	-10	5	-5	10
MG23	-10	10	-5	15
MH21	-10	15	-5	20
MH22	-10	20	-5	25
MH23	-10	25	-5	30
MJ21	-10	30	-5	35
MJ22	-10	35	-5	40
MG31	-5	0	0	5
MG32	-5	5	0	10
MG33	-5	10	0	15
MH31	-5	15	0	20
MH32	-5	20	0	25
MH33	-5	25	0	30
MJ31	-5	30	0	35
MJ32	-5	35	0	40
NG11	0	0	5	5
NG12	0	5	5	10
NG13	0	10	5	15
NH11	0	15	5	20
NH12	0	20	5	25
NH13	0	25	5	30
NJ11	0	30	5	35
NJ12	0	35	5	40

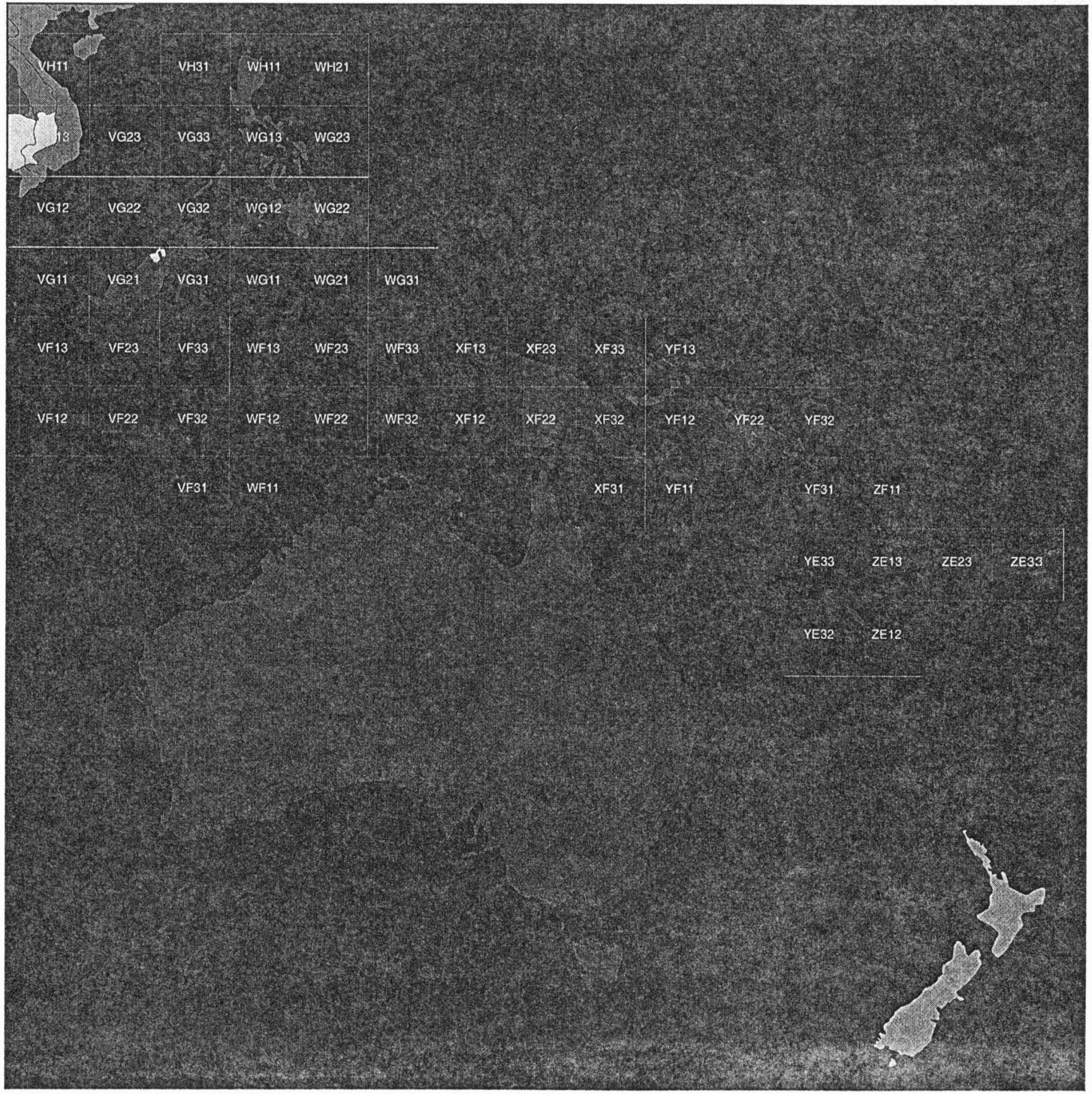
Name	Min Longitude X	Min Latitude Y	Max Longitude X	Max Latitude Y
NF23	5	-5	10	0
NG21	5	0	10	5
NG22	5	5	10	10
NG23	5	10	10	15
NH21	5	15	10	20
NH22	5	20	10	25
NH23	5	25	10	30
NJ21	5	30	10	35
NJ22	5	35	10	40
NE31	10	-30	15	-25
NE32	10	-25	15	-20
NE33	10	-20	15	-15
NF31	10	-15	15	-10
NF32	10	-10	15	-5
NF33	10	-5	15	0
NG31	10	0	15	5
NG32	10	5	15	10
NG33	10	10	15	15
NH31	10	15	15	20
NH32	10	20	15	25
NH33	10	25	15	30
NJ31	10	30	15	35
NJ32	10	35	15	40
NJ33	10	40	15	45
PD12	15	-40	20	-35
PD13	15	-35	20	-30
PE11	15	-30	20	-25
PE12	15	-25	20	-20
PE13	15	-20	20	-15
PF11	15	-15	20	-10
PF12	15	-10	20	-5
PF13	15	-5	20	0
PG11	15	0	20	5
PG12	15	5	20	10
PG13	15	10	20	15
PH11	15	15	20	20
PH12	15	20	20	25
PH13	15	25	20	30
PJ11	15	30	20	35
PD22	20	-40	25	-35
PD23	20	-35	25	-30
PE21	20	-30	25	-25
PE22	20	-25	25	-20
PE23	20	-20	25	-15
PF21	20	-15	25	-10
PF22	20	-10	25	-5
PF23	20	-5	25	0
PG21	20	0	25	5
PG22	20	5	25	10
PG23	20	10	25	15
PH21	20	15	25	20
PH22	20	20	25	25
PH23	20	25	25	30
PJ21	20	30	25	35
PD33	25	-35	30	-30
PE31	25	-30	30	-25
PE32	25	-25	30	-20
PE33	25	-20	30	-15
PF31	25	-15	30	-10
PF32	25	-10	30	-5
PF33	25	-5	30	0
PG31	25	0	30	5
PG32	25	5	30	10
PG33	25	10	30	15
PH31	25	15	30	20
PH32	25	20	30	25
PH33	25	25	30	30
PJ31	25	30	30	35
QD13	30	-35	35	-30
QE11	30	-30	35	-25
QE12	30	-25	35	-20
QE13	30	-20	35	-15
QF11	30	-15	35	-10
QF12	30	-10	35	-5
QF13	30	-5	35	0
QG11	30	0	35	5
QG12	30	5	35	10
QG13	30	10	35	15
QH11	30	15	35	20
QH12	30	20	35	25
QH13	30	25	35	30
QJ11	30	30	35	35
QJ12	30	35	35	40
QD23	35	-35	40	-30
QE21	35	-30	40	-25
QE22	35	-25	40	-20
QE23	35	-20	40	-15
QF21	35	-15	40	-10
QF22	35	-10	40	-5
QF23	35	-5	40	0
QG21	35	0	40	5
QG22	35	5	40	10
QG23	35	10	40	15
QH21	35	15	40	20
QH22	35	20	40	25
QE31	40	-30	45	-25
QE32	40	-25	45	-20
QE33	40	-20	45	-15
QF31	40	-15	45	-10
QF32	40	-10	45	-5
QF33	40	-5	45	0
QG31	40	0	45	5
QG32	40	5	45	10
QG33	40	10	45	15
RE11	45	-30	50	-25
RE12	45	-25	50	-20
RE13	45	-20	50	-15
RF11	45	-15	50	-10
RG11	45	0	50	5
RG12	45	5	50	10
RG13	45	10	50	15
RE21	50	-30	55	-25
RE22	50	-25	55	-20
RE23	50	-20	55	-15
RF21	50	-15	55	-10
RG22	50	5	55	10
RG23	50	10	55	15
RE32	55	-25	60	-20
SH12	60	20	65	25
SH13	60	25	65	30
SJ11	60	30	65	35
SJ12	60	35	65	40
SH22	65	20	70	25
SH23	65	25	70	30
SJ21	65	30	70	35
SJ22	65	35	70	40
SJ23	65	40	70	45
SG33	70	10	75	15
SH31	70	15	75	20
SH32	70	20	75	25
SH33	70	25	75	30
SJ31	70	30	75	35
SJ32	70	35	75	40
SJ33	70	40	75	45
TG12	75	5	80	10
TG13	75	10	80	15
TH11	75	15	80	20
TH12	75	20	80	25
TH13	75	25	80	30
TJ11	75	30	80	35
TJ12	75	35	80	40
TJ13	75	40	80	45
TG22	80	5	85	10
TG23	80	10	85	15
TH21	80	15	85	20
TH22	80	20	85	25
TH23	80	25	85	30
TJ21	80	30	85	35
TJ22	80	35	85	40
TJ23	80	40	85	45
TG32	85	5	90	10
TG33	85	10	90	15
TH31	85	15	90	20
TH32	85	20	90	25
TH33	85	25	90	30
TJ31	85	30	90	35
TJ32	85	35	90	40
UG11	90	0	95	5
UG12	90	5	95	10
UG13	90	10	95	15
UH11	90	15	95	20
UH12	90	20	95	25
UH13	90	25	95	30
UJ11	90	30	95	35
UF23	95	-5	100	0
UG21	95	0	100	5
UG22	95	5	100	10
UG23	95	10	100	15
UH21	95	15	100	20
UH22	95	20	100	25
UH23	95	25	100	30
UJ21	95	30	100	35
UF32	100	-10	105	-5
UF33	100	-5	105	0
UG31	100	0	105	5
UG32	100	5	105	10
UG33	100	10	105	15
UH31	100	15	105	20
UH32	100	20	105	25
VF12	105	-10	110	-5

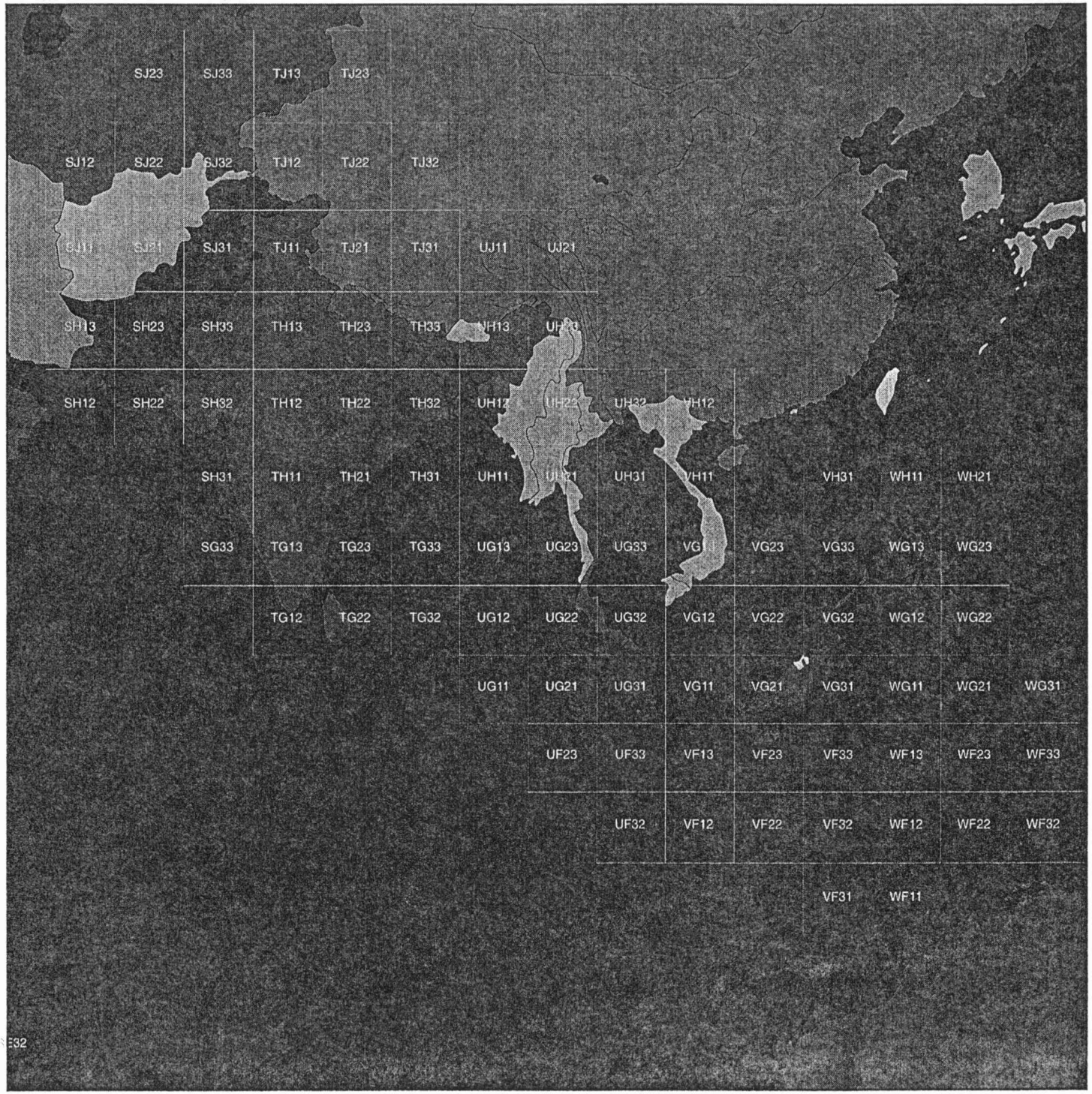
Name	Min Longitude X	Min Latitude Y	Max Longitude X	Max Latitude Y
VF13	105	-5	110	0
VG11	105	0	110	5
VG12	105	5	110	10
VG13	105	10	110	15
VH11	105	15	110	20
VH12	105	20	110	25
VF22	110	-10	115	-5
VF23	110	-5	115	0
VG21	110	0	115	5
VG22	110	5	115	10
VG23	110	10	115	15
VF31	115	-15	120	-10
VF32	115	-10	120	-5
VF33	115	-5	120	0
VG31	115	0	120	5
VG32	115	5	120	10
VG33	115	10	120	15
VH31	115	15	120	20
WF11	120	-15	125	-10
WF12	120	-10	125	-5
WF13	120	-5	125	0
WG11	120	0	125	5
WG12	120	5	125	10
WG13	120	10	125	15
WH11	120	15	125	20
WF22	125	-10	130	-5
WF23	125	-5	130	0
WG21	125	0	130	5
WG22	125	5	130	10
WG23	125	10	130	15
WH21	125	15	130	20
WF32	130	-10	135	-5
WF33	130	-5	135	0
WG31	130	0	135	5
XF12	135	-10	140	-5
XF13	135	-5	140	0
XF22	140	-10	145	-5
XF23	140	-5	145	0
XF31	145	-15	150	-10
XF32	145	-10	150	-5
XF33	145	-5	150	0
YF11	150	-15	155	-10
YF12	150	-10	155	-5
YF13	150	-5	155	0
YF22	155	-10	160	-5
YE32	160	-25	165	-20
YE33	160	-20	165	-15
YF31	160	-15	165	-10
YF32	160	-10	165	-5
ZE12	165	-25	170	-20
ZE13	165	-20	170	-15
ZF11	165	-15	170	-10
ZE23	170	-20	175	-15
ZE33	175	-20	180	-15


EH13
GH33
EH22
EH32
FH32
GH12
GH32
HH12
HH22
EH31
FH11
H11
GH21
GH31
HH11
HH21
HH31
JH11
FG33
GG13
GG23
GG33
HG13
HG23
HG33
JG13
GG12
GG22
GG32
HG12
HG22
HG32
JG12
JG22
FG31
GG21
GG31
HG11
HG21
HG31
JG21
JG31
FF33
GF23
GF33
HF13
HF23
HF33
JF13
JF23
JF33
KF13
GF22
GF32
HF12
HF22
HF32
JF12
JF22
JF32
KF12
GF31
HF11
HF21
HF31
JF11
JF21
JF31
KF11
HE13
JE13
JE23
JE33
KE13
HE12
JE22
JE32
KE12
HE11
HE21
HE31
JE21
JE31
KE11
HD13
HD23
HD33
JD13
JD23
JD33
HD12
HD22
HD32
JD12
HD11
HD21
HD31


FG33
GG13
GG23
GG33
HG13
HG23
HG33
JG13
GG12
GG22
GG32
HG12
HG22
HG32
JG12
JG22
FG31
GG21
GG31
HG11
HG21
HG31
JG11
JG21
JG31
FF33
GF23
GF33
HF13
HF23
HF33
JF13
JF23
JF33
KF13
KF23
GF22
GF32
HF12
HF22
HF32
JF12
JF22
JF32
KF12
KF22
KF32
GF31
HF11
HF21
HF31
JF11
JF21
JF31
KF11
KF21
HE13
HE23
HE33
JE13
JE23
JE33
KE13
KE23
HE12
HE22
JE22
JE32
KE12
KE22
HE11
HE21
HE31
JE21
JE31
KE11
HD13
HD23
HD33
JD13
JD23
JD33
HD12
HD22
HD32
JD12
HD11
HD21
HD31
GC33
HC13
HC23
HC12
HC22
HC32
JC12
HC11
HC21


EH13
GH33
EH22
EH32
FH32
GH12
GH32
HH12
HH22
EH31
FH11
GH11
GH21
GH31
HH11
HH21
HH31
JH11
FG33
GG13
GG23
GG33
HG13
HG23
HG33
JG13
GG12
GG22
GG32
HG12
HG22
HG32
JG12
JG22
FG31
GG21
GG31
HG11
HG21
HG31
JG21
JG31
FF33
GF23
GF33
HF13
HF23
HF33
JF13
JF23
JF33
KF13
GF22
GF32
HF12
HF22
HF32
JF12
JF22
JF32
KF12
GF31
HF11
HF31
JF11
JF21
JF31
KF11
HE13
JE13
JE23
JE33
KE13
HE12
JE22
JE32
KE12
HE11
HE21
HE31
JE21
JE31
KE11
HD13
HD23
HD33
JD13
JD23
JD33
HD12
HD22
HD32
JD12
HD11
HD21
HD31


VH11
VH31
WH11
WH21
VG23
VG33
WG13
WG23
VG12
VG22
VG32
WG12
WG22
VG11
VG21
VG31
WG11
WG21
WG31
VF13
VF23
VF33
WF13
WF23
WF33
XF13
XF23
XF33
YF13
VF12
VF22
VF32
WF12
WF22
WF32
XF12
XF22
XF32
YF12
YF22
YF32
VF31
WF11
XF31
YF11
YF31
ZF11
YE33
ZE13
ZE23
ZE33
YE32
ZE12


SJ23
SJ33
TJ13
TJ23
SJ12
SJ22
SJ32
TJ12
TJ22
TJ32
SJ11
SJ21
SJ31
TJ11
TJ21
TJ31
UJ11
UJ21
SH13
SH23
SH33
TH13
TH23
TH33
UH13
SH12
SH22
SH32
TH12
TH22
TH32
UH12
UH32
VH12
SH31
TH11
TH21
TH31
UH11
UH31
VH11
VH31
WH11
WH21
SG33
TG13
TG23
TG33
UG13
UG23
UG33
VG23
VG33
WG13
WG23
TG12
TG22
TG32
UG12
UG22
UG32
VG12
VG22
VG32
WG12
WG22
UG11
UG21
UG31
VG11
VG21
VG31
WG11
WG21
WG31
UF23
UF33
VF13
VF23
VF33
WF13
WF23
WF33
UF32
VF12
VF22
VF32
WF12
WF22
WF32
VF31
WF11