GLACIAL GEOMORPHOLOGY OF THE CENTRAL SOUTH ISLAND, NEW ZEALAND - DIGITAL DATA: EXPLANATORY NOTES

INTRODUCTION

The 1:100,000-scale geomorphological map, printed on a 5-sheet cut-up, that forms part of GNS Science Monograph 27, was generated from geospatial data in a Geographic Information System (GIS) database. The central South Island glacial geomorphological (CSIGG) digital dataset documents the distributions of glaciers, glacial moraines, outwash plains, and a range of other landforms. The focus of the map drawn from this dataset is on landforms rather than on rock types or geological deposits. A geomorphologic map highlights the origins and ages of landforms, and the CSIGG map places particular emphasis on the landforms produced by glaciers and their meltwater rivers.

The printed Monograph 27 text and maps were published and released in 2011. The digital dataset, together with metadata and these Explanatory notes, comprise GNS Science Monograph 27a, published and released in 2013. Monograph 27a is available on data disk as well as being accessible through the GNS Science website.

DATA COMPILATION AND VECTOR DATA CHARACTERISTICS

Mapping and interpretation of the geomorphologic features began in the late 1990s. The primary mapping method was the interpretation of vertical aerial photographs, viewed stereoscopically, aided by field checking, both on the ground and during aerial inspections. These photos typically have scales of between ~1:16,600 and ~1:25,000. In the latter stages of the project, use was also made of satellite imagery, especially from Google Earth. Geomorphological interpretations were drawn by hand onto 1:50,000-scale topographic base maps in the New Zealand Map Series (NZMS) 260, which have 20-m interval topographic contours. A feature of the mapping is the delineation of landform details, such as ridges of moraine built up at the margins of former glaciers, and the positions of river-cut terrace edges on the meltwater outwash plains.

The hand-drawn maps were digitized using ESRI GIS software, in geodatabase format. The vector dataset contains two types of information, lines and polygons. Each polygon represents the extent of an area of distinctive land surface, such as a moraine ridge or an outwash plain (landform type; see Tables A2-1a, 2 & 3). Each line represents a boundary between landform type polygons, or a linear feature within a landform polygon, such as a river terrace edge (see Table A2-1b). Each line and polygon has attributes that identify what it is, and in the case of polygons, an interpretation of its age. Within the polygon data, there is more detailed landform stratigraphic subdivision than is displayed on the printed map face. Refer to the Monograph 27 text for a general description of these landform categories. References listed in the captions of Table A2-2 are available in the Reference list in the Monograph 27 text.

A Data Dictionary for the CSIGG vector data follows the tables at the end of these Explanatory notes.

RELIABILITY AND LIMITATIONS

An essential part of mapping is the generalisation (omission and smoothing-out) of some details in order to achieve clarity of presentation. The CSIGG data were compiled in generalised form at 1:50,000 scale, for the generation of a regional-extent map at a scale of 1:100,000 (i.e., where one square centimetre on the map equates to one square kilometre on the ground. There is increasing mismatch between the data depicted on the map and ground-surface features, the more detailed the viewing scale. This is especially so when examining the map overlain on high-resolution imagery, such as that available via Google Earth.

A particular limitation of the CSIGG dataset applies to the depiction of active faults. Mapping was confined to those sections of an active fault that have a readily visible 'fault scarp', produced by ground-surface rupture during a fault movement event. Commonly, fault scarps are short-lived topographic features, easily removed by erosion or readily buried by sedimentation. In areas where the landforms are relatively old and remote from active landscape-modifying processes, fault scarps are more likely to be preserved. The CSIGG dataset does not contain a full or complete representation of the locations of active faults. The NZ Active Faults Database (accessible at the GNS Science website < www.gns.cri.nz >; search term < Active Faults Database >) should be used in preference to the CSIGG dataset for information on active faults in the CSIGG map area.

Similarly, the depiction of landslide terrain is focused on areas where glacial or fluvial landforms are prominently disrupted by slope instability, or have been overprinted by the run-out of rock avalanche debris onto a valley floor. For any users seeking landslide information, the landslide features mapped in the CSIGG dataset should be viewed in conjunction with other sources that depict landslides, such as the GNS Science QMAP 1:250,000-scale geological maps (accessible at the GNS Science website < www.gns.cri.nz >; search term < QMAP >). Although the CSIGG dataset was compiled for depiction at a larger scale than QMAP, the CSIGG landslide information is not necessarily superior to that of QMAP. The CSIGG dataset includes some landslide features too small to have been shown on QMAP, but it is possible that some landslides shown on QMAP lacked sufficient geomorphic expression for inclusion in the CSIGG dataset. There are instances where features interpreted as landslides on QMAP are interpreted differently in the CSIGG dataset, and vice versa.

The depiction of active river beds is based on a geomorphological interpretation of the 'usual' floodplain of a watercourse, and should not be used in isolation for assessing fluvial hazards such as flood extent, erosion or sedimentation.

WARNING

Regional-scale geospatial data, such as the CSIGG digital dataset, should not be used in isolation for any activities that require detailed or site-specific information, such as land development, engineering projects or hazard assessments.

CONTENTS OF THE MONOGRAPH 27A DATA DISK

The data disk contains vector and raster data, comprising Monograph 27a, that were used to generate the maps published in GNS Science Monograph 27. Disk contents include:

- GNS Science Monograph 27 text and maps in PDF format, as published in 2011;
- Digital data as ESRI geodatabase feature classes and as shapefiles;
- Metadata describing the contents and context of the data;
- ESRI ArcMap, ArcView and ArcReader map projects for depicting the data;
- Explanatory notes.

ESRI software is intended for use on Windows-based operating systems, and may not operate on other systems. Computers running other systems should be able to access the geospatial data using open-source GIS software. For users with Windows-based systems who do not have access to GIS software, this disk includes ArcReader software that can be installed and used to view the data.

ACKNOWLEDGEMENTS

The reader is referred to the Acknowledgements in Monograph 27 text. Funding for the publication of the digital dataset was provided by GNS Science Direct Crown Funded programme 'Global Change through Time'.

BIBLIOGRAPHIC REFERENCE

Monograph 27

Barrell, D.J.A.; Andersen, B.G.; Denton, G.H. 2011. *Glacial geomorphology of the central South Island, New Zealand*. GNS Science monograph 27. 81 p + map (5 sheets) + legend (1 sheet). Lower Hutt, New Zealand. GNS Science.

Monograph 27a

Barrell, D.J.A.; Andersen, B.G.; Denton, G.H.; Smith Lyttle, B. 2013. *Glacial geomorphology of the central South Island, New Zealand – digital data*. GNS Science monograph 27a. Geographic Information System digital data files + explanatory notes (17 p). Lower Hutt, New Zealand. GNS Science.

Table A2-1a Definitions of landform types (geom_units polygons), and associated unit codes.

Notes: The unit code generally comprises two parts separated by an underscore. The first term denotes the age-related stratigraphic name of the unit, and the second term denotes the type of landform. In cases where there is no stratigraphic identifier, a single term denotes the landform type.

Landform category	Landform type	General description	Stratigraphic name and code	Unit_code
Bedrock	General bedrock terrain	Land surface developed on bedrock, beyond the limits of Late Otiran glaciers. Commonly has irregularly dissected surface texture produced by fluvial gullying or gravitational erosion processes.	Bedrock (B)	B
	Ice-sculpted bedrock floor	Bedrock with surface texture of irregular rises and troughs produced by glacier erosion. Includes broad benches and flattened spurs on former glacier valley sides, as well as roches moutonnées on valley floors, range-crest cirque basins and former icefield beds. Characteristic landform features include ice-sculpted benches, bedrock flutes and cirque headwalls. Patchy veneers of ice-deposited sediments may be preserved.	Bedrock (B)	B_is
	Ice-smoothed bedrock valley side	Bedrock with a smooth and broadly planar, moderate to steep slope, facing into a formerly glaciated valley. Includes triangular-faceted spurs. Characteristic landform features include hanging valleys.	Bedrock (B)	B_ist
	Meltwater channel in bedrock	Steep-sided narrow channel cut into bedrock in formerly glaciated valleys, resulting from erosion by lateral or sub-glacial meltwater.	Bedrock (B)	B_ch
Moraine	General moraine	Hummocky or irregular surface texture of rises or troughs developed on ice-deposited (glaciogenic) sediments. Includes basal, lateral and terminal moraine. Characteristic landform features are ice-contact slopes and ice-scour flutes.	see Tables A2-2 & A2-3	_m
	Moraine ridge	Ridge or hill formed on ice-deposited (glaciogenic) sediments. Typically built up at an ice margin but may include ridges of glaciogenic deposits shaped by ice scour or erosion. Characteristic landform features are ice-contact slopes.	see Tables A2-2 & A2-3	_r
Fluvial	Outwash plain or terrace	Broadly planar surface developed on river or stream deposits, where the water source was mainly glacier meltwater. Former river channel patterns commonly preserved, unless masked by later accumulations of wind-blown sand or silt. Characteristic landform features are terrace edges.	see Tables A2-2 & A2-3	_o
	Alluvial plain or terrace	As for outwash, but where the water source was mainly from non-glaciated catchments.	see Tables A2-2 & A2-3	_a

	Alluvial fan	Convex, fan-shaped surface developed on stream deposits, formed where a tributary valley emerges onto a larger valley floor, basin or plain. Also includes broadly planar slopes developed on aprons of slope debris (colluvial or scree slopes).	see Tables A2-2 & A2-3	_f
Erosional	Steep eroded slope	Cliff face or steep slope formed on poorly consolidated deposits. Large-scale version of the terrace edge landform feature.	none	str
	Gully	Gully eroded into poorly consolidated deposits.	none	gully
Other landforms	Glacier	Ice mass, either flowing or stagnant. Includes perennial ice- or snow-fields. Boundaries between contiguous ice areas are drawn at drainage divides.	none	glacier
	Rock glacier	Wrinkled or undulatory surface developed on an accumulation of angular rock debris, with ridges transverse to the down-slope direction. Found in some high-mountain basins, especially in drier areas east of the Main Divide.	see Tables A2-2 & A2-3	_rk
	Kettle hole	Closed depression on moraine or outwash landforms, formed by melting of buried ice. Where large, commonly mapped as lake or pond.	none	ket
	Lake, pond, estuary or lagoon	Permanent or seasonal water body. Includes natural and artificial features, as well as water in hydroelectricity canal systems.	none	water
	Former lake bed	Low-lying land in-board of, or enclosed by, lake beach landforms.	see Tables A2-2 & A2-3	_k
	Landslide terrain	Hummocky, irregular or broken surface developed on sloping ground, caused by gravitational slope movement.	none	landslide
	Beach ridge or sand plain	Ridged or planar surface developed on shoreline deposits of sand or gravel. Includes wave-eroded benches cut on older deposits.	see Tables A2-2 & A2-3	_b
	Interglacial coastal terrace	Flat or gently sloping terrace formed on shallow marine or shoreline deposits. Includes wave-eroded benches. Preserved in coastal settings affected by tectonic uplift.	see Tables A2-2 & A2-3	_b
	Sand dune	Ridge formed by accumulation of wind-blown sand.	see Tables A2-2 & A2-3	_d
	Swamp	Low-lying area with wetland vegetation.	none	swamp

	Active river bed	Bare river bed or the episodic floodplain of a water course. Boundaries between contiguous floodplains are drawn at confluences.	none	river
	Human-modified ground	Area where the natural landform has been obscured or altered. Includes mine tailings, waste dumps, engineered embankments and dams.	none	hum

Table A2-1b Definitions of landform features (geom_units_arc) and associated codes within the CSIGG dataset.

Notes: Each feature is coded according to 'Accuracy' (certainty of location) and 'Type' (nature of the feature). The database table contains a concatenated code 'Accur_type' that combines those values, and was used to generate symbols on the printed map.

Landform category	Landform feature	Description	'Type' code	Comments
General landform features	Landform boundary	General boundary between landforms.	contact	
	Water	Edge of water body. Denotes the boundary of water polygons.	water	
	Terrace edge	Edge of a terrace. Line is oriented, so that it can be symbolised with ticks on the down-slope side.	terrace scarp	Mapped either at a boundary between polygons or within a polygon. Generally applied only where the terrace step is of fluvial origin.
	Gully margin	Edge of a gully. Line is oriented, so that it can be symbolised with ticks on the down-slope side.	gully margin	Mapped either at a boundary between polygons or within a polygon. Not mapped consistently across the map; in places the margins of gullies are mapped as terrace scarps.
	Fault scarp	Topographic step produced by late Quaternary tectonic fault displacement or buckling of the ground surface.	fault	Mapped only where a fault has made an identifiable step on the ground surface. This database does not show a full or complete representation of the locations of active faults. Use the NZ Active Faults Database in preference to the CSIGG dataset for information on active faults in the CSIGG map area.
	Beach ridge	Formline denoting the alignment of beach ridges, within a 'beach ridge or sand plain' polygon.	beach ridge	Mapped only in the Waimakariri catchment, at the shorelines of 'Glacial Lake Speight'.
	Fan formline	Formline denoting the down-slope direction on alluvial fans. Drawn schematically to give a visual sense of fan geometry.	not attributed	Contained in a separate feature class within the GIS database 'FORMLINES'. The lines do not have any specific attributes.
Moraine landform	Ice-contact slope	Crest of steep slope formed at the edge of a glacier. Line is oriented, so that it can be symbolised with teeth that point towards the	ice contact slope	Mapped either at a boundary between polygons or within a polygon.

features		position of the glacier.		
	Eroded ice-contact slope	Crest of ice-contact slope that has been reshaped by erosion after the withdrawal of ice. Line is oriented, so that it can be symbolised with teeth that point towards the position of the glacier.	eroded ice contact slope	Mapped either at a boundary between polygons or within a polygon.
	Moraine flute	Topographic lineation on a moraine, typically defined by a narrow, diffuse, ridge or trough parallel to the ice-flow direction.	not attributed	Contained in a separate feature class within the GIS database 'FLUTES'. The lines do not have any specific attributes. Mapped only in the Late Otiran moraine belt at Lake Tekapo, which is the only location in the map area that moraine flutes are prominently expressed.
	Kettle hole	Edge of kettle hole. Denotes the boundary of kettle hole polygons. Line is oriented, so that it can be symbolised with teeth that point into the kettle hole.	kettle hole	
Bedrock landform features	Cirque head-wall	Up-slope crest of a formerly glaciated, amphitheatre-shaped basin (cirque). Line is oriented, so that it can be symbolised with teeth that point into the basin.	cirque	Mapped only where ice-sculpted bedrock floors are preserved in a basin. Cirque symbols are not shown in basins that are likely to have been glaciated but where no glacially-trimmed bedrock surfaces remain.
	Hanging valley	Mouth of a formerly glaciated valley where it adjoins a larger, deeper, formerly glaciated valley. Line is oriented, so that it can be symbolised with teeth that point upstream into the hanging valley.	hanging valley	Mapped only where ice-sculpted bedrock floors or ice-smoothed bedrock valley sides are preserved. Hanging valley symbols are not shown at the mouths of valleys where no glacially-trimmed bedrock surfaces remain.
	Bedrock flute	Topographic lineation on ice-scoured bedrock, typically defined by a narrow, diffuse, ridge or trough parallel to the ice-flow direction.	ice sculpted lineament	Mapped only within ice-sculpted or ice-smoothed bedrock polygons.
	Ice-sculpted bench	Edge of a terrace or bench on ice-scoured bedrock. Line is oriented, so that it can be symbolised with teeth on the down-slope side.	ice sculpted bench	Mapped only within ice-sculpted or ice-smoothed bedrock polygons.

	Eroded ice-sculpted bench	Edge of an ice-sculpted bench that has been reshaped by erosion after the withdrawal of ice. Line is oriented, so that it can be symbolised with teeth on the down-slope side.	eroded ice sculpted bench	Mapped only within ice-sculpted or ice-smoothed bedrock polygons.
	Meltwater channel margin	Crest of margin of meltwater channel in bedrock. Line is oriented, so that it can be symbolised with teeth that point into the channel.	fluvial channel margin	Mapped at the boundaries of ‘meltwater channel in bedrock’ polygons.

Table A2-2a Quaternary stratigraphic names in the central South Island, in relation to the landform classification polygons used in the CSIGG dataset and approximate correlations to Marine Isotope Scale (MIS) stages.

Notes: Informal names for ice advances are in italics, while published formation names are in normal text. Local names that are included in the geomorphologic map GIS database (as codes: see Table A2-2b) are bold, along with generalised units in the 'Southern Alps (undifferentiated)' column. Black dotted lines indicate age ranges, while red lines indicate that ages are uncertain, or that a named unit may possibly be of more than one age. The placement of stratigraphic names reflects how they are shown in the CSIGG map, and in some cases differs from the original sources. Parentheses indicate stratigraphic units that are amalgamated with the stratigraphic name given in bold. Modified from Table 2 of the Monograph 27 text; see caption of that Table for more information. In the 'Westland lowlands' column, in blue text are interglacial coastal terraces, Rutherglen (inferred age MIS 5) and Karoro (inferred age MIS 7); Awatuna terraces of Suggate (1992) not differentiated from Rutherglen terraces.

ERRATA: Two corrections are made in respect to information in Table 2 of Monograph 27 text, on which this table is based. 'Jagged Stream' is used in the GIS dataset, whereas 'Pyramid' is not. Pyramid Formation as mapped by Oliver & Keene (1989, 1990) is either: (i) not differentiated from Dogs Hill Formation (i.e. mapped as single units of Dogs Hill landforms, e.g., Lake Heron basin area); or (ii) mapped as Hororata Formation (west of the Mt Somers area).

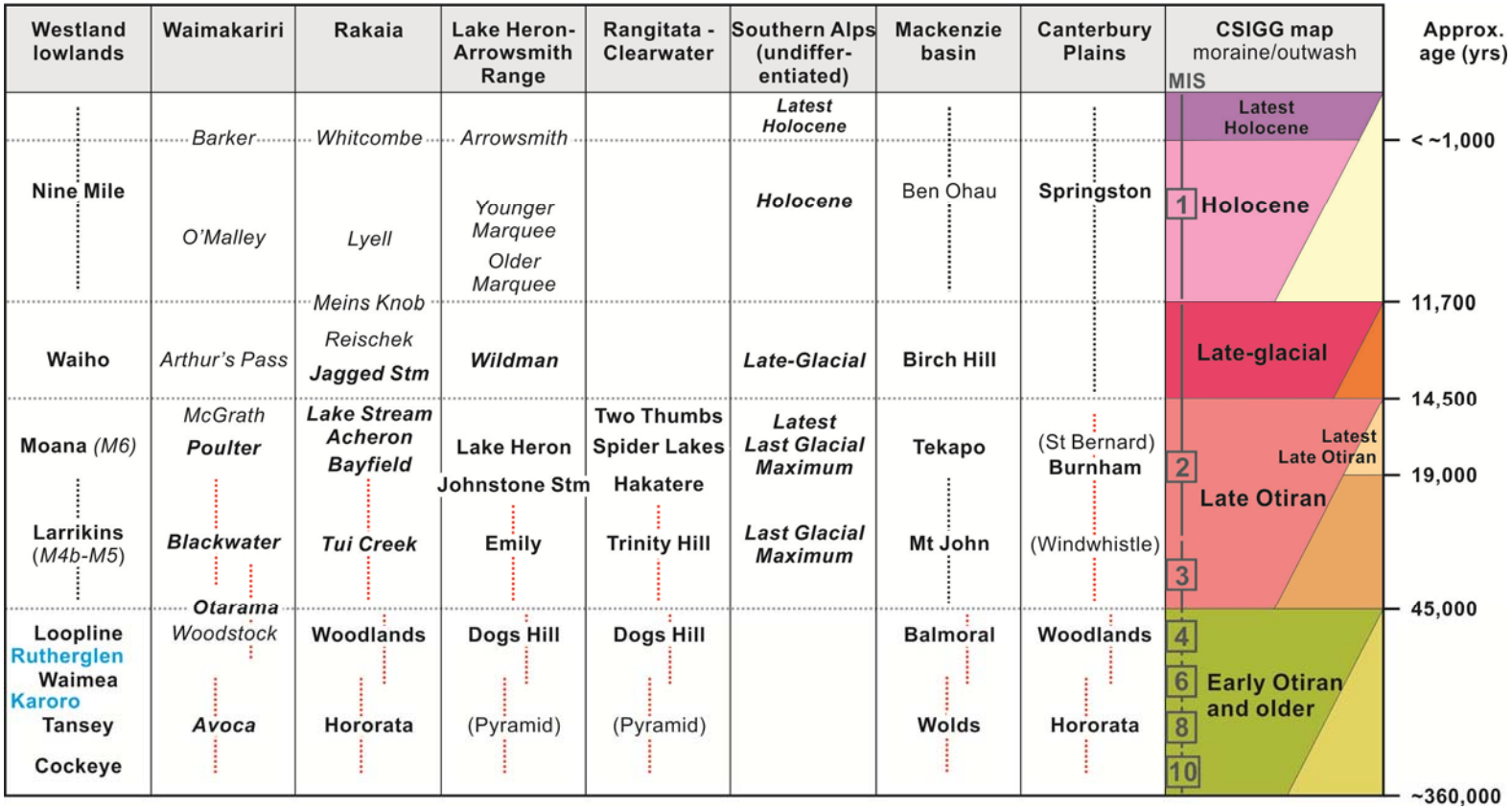

Table A2-2b Geomorphological unit codes for stratigraphic names used in the CSIGG dataset landform polygons.

Notes: For full names, see Table A2-2a. Note that for the Southern Alps undifferentiated category, 'Pg' by itself is used only for Holocene glacial outwash plains or terraces (Pg_o) and for Holocene rock glaciers (Pg_rk), while the differentiated codes 'lPg' and 'ePg' are used only for moraines and moraine ridges. Sectors of the Canterbury Plains outwash surfaces southwest of the Rakaia River that are judged to be somewhat older than typical Burnham surfaces are coded as Lgm_o, apart from one area near Rakaia Gorge that is coded as Tui Creek outwash (Tc_o) where direct connection can be seen to Tui Creek moraines. At the eastern fringe of the Canterbury Plains, Sp includes the estuarine, lacustrine and marginal marine (including coastal dune) landforms developed on Christchurch Formation deposits.

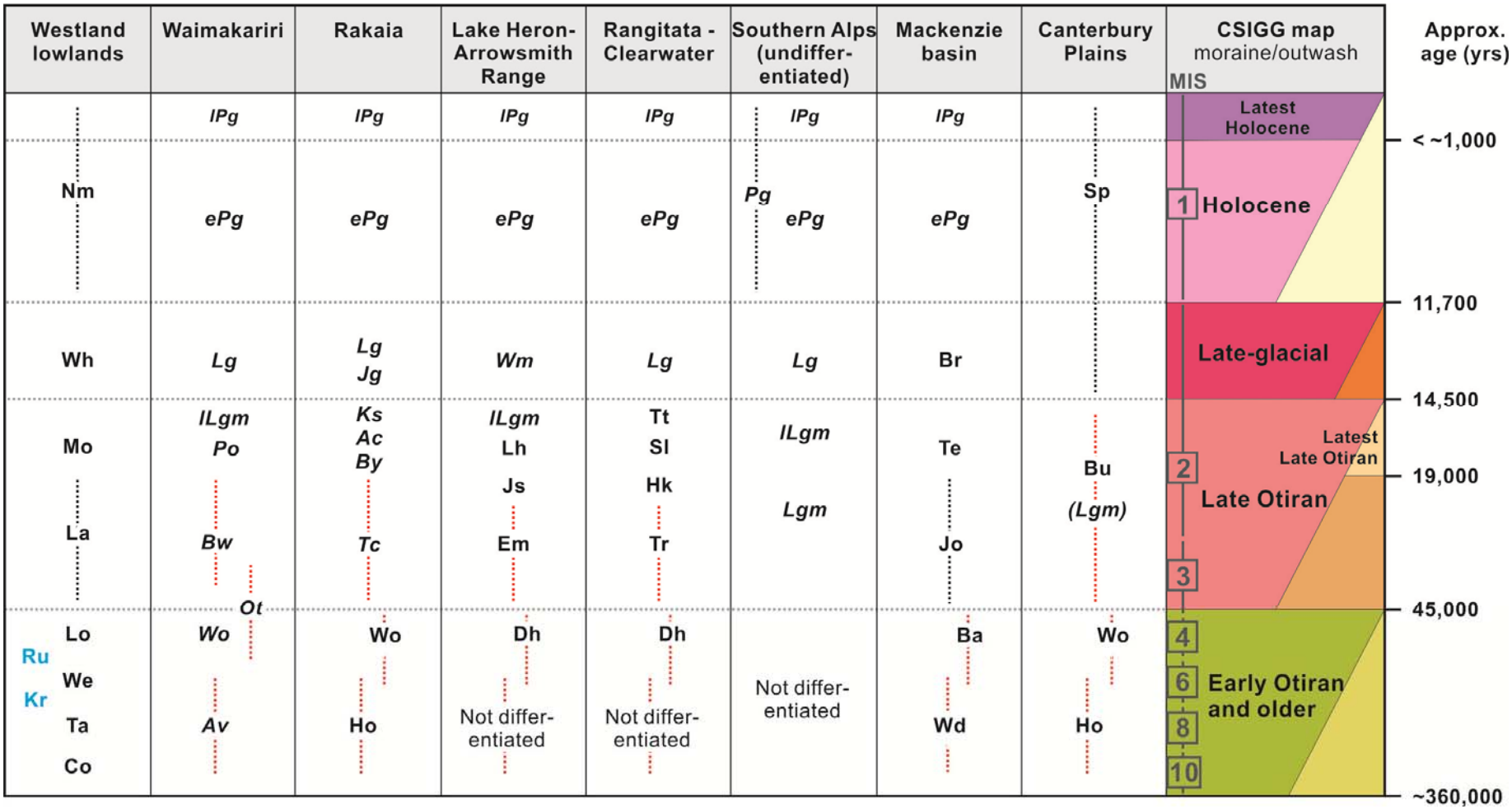

Table A2-3 Geomorphological "Feature" categories in relation to unit codes for the 'geom_units' polygon GIS layer, as set out in the legend of the printed CSIGG map.

Feature category	Unit codes within this category
GENERAL LANDFORMS	
BEDROCK LANDFORMS	
General bedrock terrain	B
Ice-sculpted bedrock surface	B_is
Ice-trimmed bedrock slope	B_ist
Fluvial channel in bedrock	B_ch
OTHER LANDFORMS	
Glacier	glacier
Active river plain	river
Lake, pond, estuary or lagoon	water
Kettle hole	ket
Swamp or abandoned lake bed	swamp
Human-modified landform	hum
Landslide terrain	landslide
Steep eroded slope in Quaternary deposits	str
Gully	gully
LANDFORMS GROUPED BY AGE	
HOLOCENE LANDFORMS	
latest Holocene moraine	lPg_m
latest Holocene moraine ridge	lPg_r
Holocene moraine	ePg_m
Holocene moraine ridge	ePg_r
Holocene outwash plain or terrace	Pg_o
Holocene alluvial plain or terrace	Nm_a, Sp_a
Holocene alluvial fan	Nm_f, Sp_f
Holocene rock glacier	Pg_rk
Holocene sand dune	Nm_d, Sp_d

Holocene lake bed	Nm_k, Sp_k
Holocene beach ridge or beach plain	Nm_b, Sp_b
LATE-GLACIAL LANDFORMS	
Late-glacial moraine	Br_m, Jg_m, Lg_m, Wh_m, Wm_m
Late-glacial moraine ridge	Br_r, Jg_r, Lg_r, Wh_r, Wm_r
Late-glacial outwash surface	Lg_o, Wm_o
LATE OTIRAN LANDFORMS	
latest Late Otiran moraine	Ac_m, By_m, Ks_m, Lh_m, lLgm_m, Mo_m, Po_m, Sl_m, Te_m, Tt_m
latest Late Otiran moraine ridge	Ac_r, By_r, Ks_r, Lh_r, lLgm_r, Mo_r, Po_r, Sl_r, Te_r, Tt_r
latest Late Otiran outwash surface	Ac_o, Bu_o, By_o, Ks_o, Lh_o, lLgm_o, Mo_o, Po_o, Sl_o, Te_o
latest Late Otiran alluvial plain or terrace	Bu_a
latest Late Otiran alluvial fan	Ac_f, Bu_f, By_f, lLgm_f, Po_f
latest Late Otiran sand dune	Bu_d
latest Late Otiran lake bed	Po_k
latest Late Otiran beach	Bu_a, Ac_b, Po_b, Te_b
Late Otiran moraine	Bw_m, Em_m, Hk_m, Jo_m, Js_m, La_m, Lgm_m, Tc_m, Tr_m
Late Otiran moraine ridge	Bw_r, Em_r, Hk_r, Jo_r, Js_r, La_r, Lgm_r, Tc_r, Tr_r
Late Otiran outwash surface	Bw_o, Em_o, Hk_o, Jo_o, Js_o, La_o, Lgm_o, Tc_o, Tr_o
Late Otiran alluvial plain or terrace	Bw_a, La_a
Late Otiran alluvial fan	Bw_f, La_f, Lgm_f
EARLY LATE OTIRAN OR OLDER LANDFORMS	
Early Otiran or older moraine	Av_m, Ba_m, Co_m, Dh_m, Ho_m, Lo_m, Ot_m, Ta_m, Wd_m, We_m, Wo_m
Early Otiran or older moraine ridge	Av_r, Ba_r, Co_r, Dh_r, Ho_r, Lo_r, Ot_r, Ta_r, Wd_r, We_r, Wo_r
Early Otiran or older outwash surface	Av_o, Ba_o, Co_o, Dh_o, Ho_o, Lo_o, Ot_o, , a_o, Wd_o, We_o, Wo_o
Early Otiran or older alluvial plain or terrace	Av_a, Ho_a, Ot_a, Ru_a, Wo_a
Early Otiran or older alluvial fan	Ho_f, Ta_f, We_f, Wo_f
Early Otiran or older sand dune	Wo_d
Early Otiran or older marine terrace	Kr_b, Ru_b

DATA DICTIONARY

The following pages contain the data dictionary structure for each GIS layer of the central South Island glacial geomorphological map. A data dictionary is a set of rules for how the data are categorised into layers and attributes. A strictly defined data structure enables data to be merged, manipulated and understood.
The dictionary describes the user-defined fields for attribute tables within each layer or feature class, and the format of each field. An attribute table has several required fields relating to the organisation of the data, including fields such as SHAPE_Area (calculating the area of a feature in map units) and SHAPE_Length (calculating the perimeter of a feature in map units) for polygon feature classes, and Shape_Length (calculating the length of a feature in map units) for arc feature classes.

The format for user-defined attribute fields is dictated by data type and defined in terms of:

alias (variant field name),

allow NULL values

Default value

For text, there are the additional properties of

Domain (user-defined range of values)

Length (of character string)

The data types used in this dataset are:

Double	(numeric)
Long Integer	(numeric)
Text	(string)

Feature Classes:

FLUTES
(arc feature class)
No attribute fields

Lines marking ice-scour topographic lineations on moraine landforms, parallel to ice-flow direction

FORMLINES
(arc feature class)
No attribute fields

Lines schematically depicting the down-slope direction on alluvial fans

GEOM_UNITS
(polygon feature class)

Geomorphological units denoting the spatial extent of landform types

Attribute field	Description	Data Type
UNIT_CODE		
(unrestricted)	A mapping unit letter code made up of "formation"_"feature" e.g. Mo_m = "Moana Formation moraine"; or "feature" e.g. B_ch = "Fluvial channel in bedrock"	Text
alias	UNIT_CODE	
allow NULL values	Yes	
Default value		
Domain		
Length	10	
km2		
(calculation)	Area of feature in square kilometres	Double
alias	AREA_(km2)	
allow NULL values	Yes	
Default value		
FEATURE		
(restricted)	Simple description of landform type	Text
alias	FEATURE	
allow NULL values	Yes	
Default value		
Domain	FEATURE	
Length	50	

GEOM_UNITS_ARCS (arc feature class)

Lines denoting features of landforms, including the nature of boundaries between geomorphological units, and the nature of linear features within geomorphological unit

Attribute field	Description	Data Type
ACCURACY		
(restricted)	Qualitative estimate of accuracy of location	Text
alias	ACCURACY	
allow NULL values	Yes	
Default value		
Domain	ACCURACY	
Length	16	
TYPE		
(restricted)	Geomorphological boundary or feature type, e.g. ice contact slope, terrace scarp	Text
alias	TYPE	
allow NULL values	Yes	
Default value		
Domain	TYPE	
Length	40	
PLOT_RANK		
(unrestricted)	Smallest appropriate scale for plotting	Long Integer
alias	PLOT_RANK	
allow NULL values	Yes	
Default value		
ACCUR_TYPE		
(calculation)	Concatenation of ACCURACY and TYPE; produces link to map symbols for lines	Text
alias	FEATURE	
allow NULL values	Yes	
Default value		
Domain		
Length	56	

Ranges of values available for DOMAIN tables:

ACCURACY
accurate
approximate
concealed
uncertain

TYPE
beach ridge
cirque
contact
eroded ice contact slope
eroded ice sculpted bench
fan formline
fault
flute
fluvial channel margin
gully margin
hanging valley
ice contact slope
ice sculpted bench
ice sculpted lineament
kettle hole
terrace scarp
water

FEATURE
Active river plain
Early Otiran or older alluvial fan
Early Otiran or older alluvial plain or terrace
Early Otiran or older marine terrace
Early Otiran or older moraine
Early Otiran or older moraine ridge
Early Otiran or older outwash surface
Early Otiran or older sand dune
Fluvial channel in bedrock
General bedrock terrain
Glacier
Gully
Holocene alluvial fan
Holocene alluvial plain or terrace
Holocene beach ridge or beach plain
Holocene lake bed
Holocene moraine
Holocene moraine ridge
Holocene outwash plain or terrace
Holocene rock glacier
Holocene sand dune
Human-modified landform
Ice-sculpted bedrock surface
Ice-trimmed bedrock slope
Kettle hole
Lake, pond, estuary or lagoon
Landslide terrain
Late-glacial moraine
Late-glacial moraine ridge
Late-glacial outwash surface
Late Otiran alluvial fan
Late Otiran alluvial plain or terrace
Late Otiran moraine
Late Otiran moraine ridge
Late Otiran outwash surface
latest Holocene moraine
latest Holocene moraine ridge
latest Late Otiran alluvial fan
latest Late Otiran alluvial plain or terrace
latest Late Otiran beach
latest Late Otiran lake bed
latest Late Otiran moraine
latest Late Otiran moraine ridge
latest Late Otiran outwash surface
latest Late Otiran sand dune
Steep eroded slope in Quaternary deposits
Swamp or abandoned lake bed