Search | Main Menu

GEOLOGIC HAZARD MAP: USE OF LITHOLOGIC UNITS MAP AS BASE FOR THEIR REALIZATION

INSTITUTO DE GEOLOGIA Y RECURSOS MINERALES
SEGEMAR SERVICIO GEOLOGICO MINERO ARGENTINO

Gonzalez, M. A.- DGAA - IGRM - SEGEMAR. Argentina
marigo@secind.mecon.gov.ar

Stratigraphic chart

Geological information from Geological map of the Mendoza Sheet.

Holocene	Recent colluvial and alluvial deposits of foot hills.	Thick fanglomerates, gravels and thick and median sands.
	Eolian deposits	Median and fine sands.
	Ramblones	Silts and silty salty clays.
	Recent alluvial plain deposits and alluvial deposits	Silts, clays and sands.
	Lacustral deposits and deposits of beach	Silts, sands and clays.
Pleistocene	Deposits of fluvial valley	Thick gravels and sands.
	Alluvial fan of the Mendoza river deposits	Unconsolidates conglomerates, thick gravels, sands, clays and silts.
	Piedemont deposit	Fanglomerates, polymictics gravels, sands and silts.
	Beds of "El Borbollón"	Silty claystone, clays, silts, sands and tephra.
Neogene	Mogotes Formation	Conglomerates, silty clays, sandstones y tuffs.
	Loma de las Tapias Formation	Conglomerates, sands and silts.
Paleogene	Mariño Formation	Conglomerates, sandstones,clays and sany clay tuffaceous.
	Hipabysales La Canota	Andesites, dacites and liparite.
	Plutonites and hipabysales Las Peñas	Gabbros, diorites and pyroxenites
	Divisadero Largo Formation	Clystones, siltstones, sandstonres and conglomerates.
Cretaceous	Riquiliponche Sedimentites	Sandstonres, siltstones and gypsum.
	Papagayos Formation	Conglomerates, sandstones and siltstones
Triassic	Uspallata Group	Conglomerates, sandstonres,claystones, siltstones and tuffs
Carboniferous	Jegenes Formation	Sandstones and grauwakes
	Leoncito Formation	Diamictite, siltstones and sandstones.
Devonian	Villavicencio Group	Grauwakes, slates, shales and fine conglomerates.
Devonian / Silurian	Rinconada Formation	Limestones, pelites and sandstones.
Ordovician	Empozada Formation	Shales, calcarenites and conglomerates.
	San Juan Formation	Limestones, marls and cherts.
Cambrian	Marquesado Group	Limestones, dolomity limestones, dolomite, marls, shales and cherts..
Proterozoic	Caucete Group	Marbles and phyllonite

Field notes

Basic division (roman numbers)	Genesis or lithological nature.
Characterization (letters)	- Mechanic characterization of the rock. (ISRM) - Characterization of the discontinuities. - Characterization of the superficial deposit (permeability, pororsity, composition , compactation)

Proyect: Operator: Date:	station: place:		sheet: photo:				
Lithology	nature		thickness		formation and age		
Superficial formation	nature and texture		morphology		thikness		
Structure	fold		fault		other		
Fracturing	Blocks	very big	big	medium	small	very small	Brechified
Intact rock strength	extremely weak	very weak	weak	medium	strong	very strong	extremely strong
Weathering degree	fresh	sligh	moderate	high	very high	residual soil	
Hidrology	without water	Dry (water signs)	humid	trickle	flow	discharge	

N°			Spacing							Continuity					Opening									Roughness									Fills																		
										Strike / Dip														stepped			Undulating			Planar					Weathering						Filtrations				strength						
Type of plane	Dip direction	Dip	Extremely close	Very close	Close	Moderately close	Separate	Very separate	Extremely separate	Very low	low	moderate	high	Very high	Very closed	closed	Parcially open	open	Moderately open	wide	Very wide	Extremately wide	cavernous	rough	smooth	slickensided	rough	smooth	slickensided	rough	smooth	slickensided	Composition	Thickness	fresh	slightly	Moderately	highly	completely	Residual soil	dry	humid	trickle	flow	Very weak	weak	consistent	Very consistent	strong	Very strong	Strength-hand penetr.

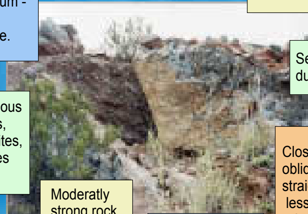
Lithologic Units

Applied information resumed from the map of lithologic units of the Mendoza Sheet as a base for the realization of Geological Hazard Map.

SUPERFICIAL DEPOSITS	I.a.	Silts and organic materials 1. Phreatic minimun depth: 0-1m 2. Phreatic depth 0-600 m. Above sea level 3. Phreatic minimun depth 600 m Above sea level 4. Silts and tuff
	I.b.	Sands and clays: medium permeability, loam soils, clay loam soils with coarse lithic fragments.
	I.c.	Sands and silts: Medium – low permeability, loam soils, silt-clay soils with sandy levels.
	I.d.	Sands: High permeability. Sandy and loam soils.
SEDIMENTARY ROCKS	II.a.	Calcareous rocks: Slightly fractured outcrop with competent rock substance: Fresh rock substance, only slightly meteorized by sectors. Coarse fragments (1-4m[3]), strong rock (100-250 Mpa), secondary permeability due to fracturation, 2,5 a 10 mm wide discontinuities without fill, smooth and plains, 3-10 m continuity. Near to the fractures the continuity is low (1-3 m) and the separation is minor (200-600mm).
	II.b.	Sandstones: Fractured outcrop with competent rock substance interbeded with incompetent levels: 50-200 Mpa moderately - strong rock, with metric to centimetric beds. Discontinuities filled by fragile gypsum or without filling. Aperture 0,5 cm wide joints, low to very low continuiy (less than 1m), plain roughness, basically orthogonal shape, without presence of water.
	II.c.	Sandstones and tuff: Rock mass with medium resistent rock substance, very fragile. Low resistance matrix, secondary permeability due to fracturation and gypsum disolution. Spacement discontinuities closer to médium closer (60 – 600 mm) with low continuity (1-3 m), partially open (0,25 a 0,5 m), plain roughness, without filling.
IGNEOUS ROCKS	III	Andesites, dacites, gabbros, diorites and pyroxenites. Hipabyssal rocks that appear in small isolated bodies and associated dikes.
METAMORPHIC ROCKS	IV	Sanndstone, calcareous sandstones, marbles, metawackes, quartzites. Metamorphic rocks: Folded and faulted rock mass with competent rock substance. Zones with alteration and fragil levels: moderatly strong rock (50-100 Mpa), interbeded with very weak rock (5 a 25 Mpa). Closed discontinuities, oblique to the stratification, straight, smaller continuity to 20 cm, four joints sets.

Metamorphic Rocks

RMR: Fair



Rock mass with medium - low resistent rock substance, very fragile.

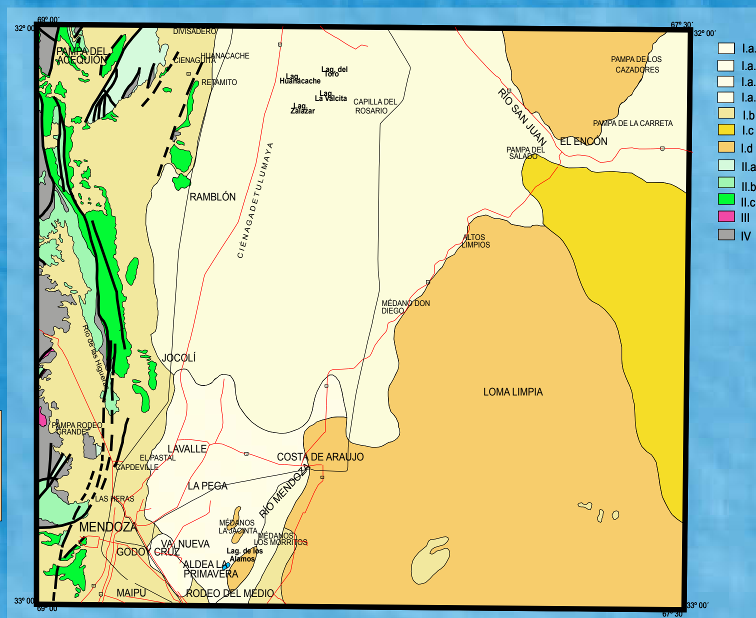
Sandstones, calcareous sandstones, marbles, metawackes, quartzites, slates, phyllite, shales and marls.

Secondary permeability due to fracturation.

Moderatly strong rock (50-100Mpa) interbedded with very weakrock (5 a 25 Mpa)

Folded and faulted rock mass with strong brechified

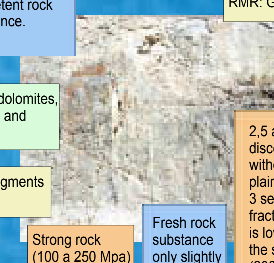
Closed discontinuities, oblique to the stratification, straigth,smaller continuity less than 20 cm, four sets of joints.



Lithologic units Map

Sedimentary Rocks

RMR: Good



Slightly fractured rock mass with competent rock substance.

Secondary permeability due to fracturation

Limestones, dolomites, shales, marls and chert.

Coarse fragments 1 - 4 m[3]

2,5 a 10 mm wide discontinuities without fill, smooth and plain,3 - 10 m continuity 3 set of joints.Near to the fractures the continuity is low (1 - 3 m) and the separation is lower (200 - 600 mm).

Strong rock (100 a 250 Mpa)

Fresh rock substance only slightly meteorized by sectors