Subject: Glossary of terms for PanGeo

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Note, the compilation of this glossary is ongoing throughout the project. New versions will be produced as required. Only the latest version will reside in the Document Library in the following location:Documents/Technical Memoranda

Sources:

- ISDR (2009) *UNISDR Terminology on Disaster Risk Reduction*, UNISDR, Geneva, Switzerland.
- EC DG Environment (2008) *Assessing the potential for a comprehensive community strategy for the prevention of natural and man-made natural disasters*, DG environment, Brussels.
- PanGeo Colleagues: Don Aldiss, Luke Bateson (BGS), David Norbury (European Federation of Geologists, Stephen Gruijters (TNO)

Acceptable risk: The level of potential losses that a society or community considers acceptable given existing social, economic, political, cultural, technical and environmental conditions.

Adaptation: The adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities.

Building code: A set of ordinances or regulations and associated standards intended to control aspects of the design construction, materials, alteration and occupancy of structures that are necessary to ensure human safety and welfare, including resistance to collapse and damage.

Capacity: The combination of all the strengths, attributes and resources available within a community, society or organization that can be used to achieve agreed goals.

Capacity development: The process by which people, organizations and society systematically stimulate and develop their capacities over time to achieve social and economic goals, including through improvements of knowledge, skills, systems and institutions.

Climate change:
a) The Inter-governmental Panel on Climate Change (IPCC) defines climate change as: “a change in the state of the climate that can be identified (e.g. by using statistical tests) by changes in the mean and/or the variability of its properties, and that persists for an extended period, typically decades or longer. Climate change may be due to natural internal processes or external forcings, or to persistent anthropogenic changes in the composition of the atmosphere or in land use”.

b) The United Nations Framework Convention on Climate Change (UNFCCC) defines climate change as “a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods”.

Coping capacity: The ability of people, organisations and systems, using available skills and resources, to face and manage adverse conditions, emergencies or disasters.

Corrective disaster risk management: Management activities that address and seek to correct or reduce disaster risks which are already present.

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Critical facilities: The primary physical structures, technical facilities and systems which are socially, economically or operationally essential to the functioning of a society or community, both in routine circumstances and in the extreme circumstances of an emergency.

Disaster: A serious disruption of the functioning of a community or society involving widespread human, material, economic or environmental losses and impacts, which exceeds the ability of the affected community or society to cope using its own resources.

Disaster risk: The potential disaster losses, in lives, health status, livelihoods, assets and services, which could occur to a particular community or a society over some specified future time period.

Disaster risk management: The systematic process of using administrative directives, organisations and operational skills and capacities to implement strategies, policies and improved coping capacities in order to lessen the adverse impacts of hazards and the possibility of disaster.

Disaster risk reduction: The concept and practice of reducing disaster risks through systematic efforts to analyse and manage the causal factors of disasters, including through reduced exposure to hazards, lessened vulnerability of people and property, wise management of land and the environment, and improved preparedness for adverse events.

Disaster risk reduction plan: A document prepared by an authority, sector, organization or enterprise that sets out goals and specific objectives for reducing disaster risks together with related actions to accomplish these objectives.

Emergency: Any situation which has or may have an adverse impact on people, the environment and property.

Emergency management: The organization and management of resources and responsibilities for addressing all aspects of emergencies, in particular preparedness, response and initial recovery steps.

Environmental degradation: The reduction of the capacity of the environment to meet social and ecological objectives and needs.

Environmental impact assessment: Process by which the environmental consequences of a proposed project or program are evaluated, undertaken as an integral part of planning and decision-making processes with a view to limiting or reducing the adverse impacts of the project of program.

Exposure: People, property, systems or other elements present in hazard zones that are thereby subject to potential losses.

Extensive risk: The widespread risk associated with the exposure of dispersed populations to repeated or persistent hazard conditions of low or moderate intensity, often of a highly localized nature, which can lead to debilitating cumulative disaster impacts.

Forecast: Definite statement or statistical estimate of the likely occurrence of a future event or conditions for a specific area.

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Geological (Geo) hazard: Geological process or phenomenon that may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption or environmental damage.

Geohazard types (as used in the PanGeo Ground Stability Layer classification)**:**

DEEP SEATED MOTIONS

Earthquake (seismic) hazard: Earthquakes are the observable effects of vibrations (known as seismic waves) within the Earth's crust arising from relatively rapid stress release, typically along a fault zone. Damage to buildings and other infrastructure can be caused as the ground shakes during the passage of seismic waves. Other effects include liquefaction of water-saturated soft ground, potentially leading to a loss in ground strength and the extrusion of water-saturated sediments as 'mud volcanoes' and the like. Ground shaking can also trigger secondary events such as landslides and tsunami. Some earthquakes are associated with significant permanent vertical or lateral ground movement. Changes to drainage systems can cause flooding. There is potential for injury and loss of life during earthquakes. Seismic hazard can be assessed by reference to the size and frequency of recorded earthquakes, although individual earthquakes are essentially unpredictable. Individual events occur on time-scales of seconds or minutes. Modern infrastructure should be designed to withstand probable local seismic events.

Tectonic movements: Tectonic movements are large scale processes that affect the earth's crust. These processes can lead to areas of the crust rising or falling. Importantly it is the neotectonic movements that area still active and may therefore produce a ground motion that can be measured by InSAR. Neotectonic movements are typically due to the stresses introduced through moments of the earth's plates. These types of motion are likely to be on a broad scale and so it may not be possible to measure them using the SAR scene relative measurements of InSAR.

Salt Tectonics: Localised motions can be associated with the movement of evaporate deposits, these are termed Salt tectonics and can produce both uplift and subsidence depending on the exact mechanisms at play.

Volcanic hazard: Volcanic activity can lead to the creation of lava flows, ash flows, debris and ash falls, and debris flows of various kinds. It might be accompanied by release of poisonous or suffocating gases, in some instances with explosive violence, or by significant seismic activity or ground movement. Secondary effects can include landslide and flooding.

NATURAL GROUND INSTABILITY

The propensity for upward, lateral or downward movement of the ground that can be caused by a number of natural geological processes. Some movements associated with particular hazards may be gradual or occur suddenly and also may vary from millimetre to metre or tens of metres scale. Note that anthropogenic deposits can be affected by natural ground instability. Significant natural ground instability has the potential to cause damage to buildings and structures, and weaker structures are most likely to be affected. It should be noted, however, that many buildings, particularly more modern ones, are built to such a standard that they can remain unaffected in areas of even significant ground movement. The susceptibility of built structures to damage from geohazards might also depend on local factors such as the type of nearby vegetation, or the nature of the landforms in the area. The effects of natural ground instability often occur over a local area as opposed to the effects of natural ground movements which occur over larger areas.

Landslide: A landslide is a relatively rapid outward and downward movement of a mass of rock or soil on a slope, due to the force of gravity. The stability of a slope can be reduced by removing ground at the base of the slope, increasing the water content of the materials forming the slope or by placing material on the slope, especially at the top. Property damage by landslide can occur through the removal of supporting ground from under the property or by the movement of material onto the property. Large landslides in coastal areas can cause tsunami. The assessment of landslide hazard refers to the stability of the present land surface, including existing anthropogenically-modified slopes as expressed in local topographic maps or digital terrain models. It does not encompass a consideration of the stability of new excavations. Land prone to landslide will normally remain stable unless the topography is altered by erosion or excavation, or the land is loaded, or pore water pressure increases. Landslide might also be initiated by seismic shock, frost action, or change in atmospheric pressure. This hazard is significant in surface deposits but may extend to more than 10m depth. The common consequences are damage to properties, including transportation routes and other kinds of infrastructure, and underground services. Some landslides can be stabilised by engineering.

Soil Creep: Soil creep is a very slow movement of soil and rock particles down slope and is a result of expansion and contraction of the soil through cycles of freezing and thawing or wetting and drying.

Ground Dissolution: Some rocks and minerals are soluble in water and can be progressively removed by the flow of water through the ground. This process tends to create cavities, potentially leading to the collapse of overlying materials and possibly subsidence at the surface. The common types of soluble rocks and minerals are limestones, gypsum and halite. Cavities can become unstable following flooding, including flooding caused by broken service pipes. Changes in the nature of surface runoff, excavating or loading the ground, groundwater abstraction, and inappropriate installation of soakaways can also trigger subsidence in otherwise stable areas.

Collapsible Ground: Collapsible ground comprises materials with large spaces between solid particles. They can collapse when they become saturated by water and a building (or other structure) places too great a load on it. If the material below a building collapses it may cause the building to sink. If the collapsible ground is variable in thickness or distribution, different parts of the building may sink by different amounts, possibly causing tilting, cracking or distortion. Collapse will occur only following saturation by water and/or loading beyond criticality. This

hazard can be significant in surface deposits and possibly also in buried superficial deposits.

Running Sand: Running sand occurs when loosely-packed sand, saturated with water, flows into an excavation, borehole or other type of void. The pressure of the water filling the spaces between the sand grains reduces the contact between the grains and they are carried along by the flow. This can lead to subsidence of the surrounding ground. If sand below a building runs it may remove support and the building may sink. Different parts of the building may sink by different amounts, possibly causing tilting, cracking or distortion. The common consequences are damage to properties or underground services. This hazard tends to be self-limited by decrease in head of water.

NATURAL GROUND MOVEMENT

Shrink-swell clays: A shrinking and swelling clay changes volume significantly according to how much water it contains. All clay deposits change volume as their water content varies, typically swelling in winter and shrinking in summer, but some do so to a greater extent than others. Most foundations are designed and built to withstand seasonal changes. However, in some circumstances, buildings constructed on clay that is particularly prone to swelling and shrinking behaviour may experience problems. Contributory circumstances could include drought, leaking service pipes, tree roots drying-out of the ground, or changes to local drainage such as the creation of soakaways. Shrinkage may remove support from the foundations of a building, whereas clay expansion may lead to uplift (heave) or lateral stress on part or all of a structure; any such movements may cause cracking and distortion. The existence of this hazard depends on a change in soil moisture and on differential ground movement. Uniform ground movement may not of itself present a hazard. This hazard is generally significant only in the top five metres of ground.

Compressible Ground: Many ground materials contain water-filled pores (the spaces between solid particles). Ground is compressible if a building (or other load) can cause the water in the pore space to be squeezed out, causing the ground to decrease in thickness. If ground is extremely compressible the building may sink. If the ground is not uniformly compressible, different parts of the building may sink by different amounts, possibly causing tilting, cracking or distortion. This hazard commonly depends on differential compaction, as uniform compaction may not of itself present a hazard. Differential compaction requires that some structure that might be susceptible to subsidence damage has been built on non-uniform ground. The common consequences are damage to existing properties that were not built to a sufficient standard, and possible damage to underground services.

ANTHROPOGENIC GROUND INSTABILITY

Ground motions covering a local area which have been brought about by the activity of man. Subsidence (downward movement) of the ground can result from a number of different types of anthropogenic activity, namely mining (for a variety of commodities), or tunnelling (for transport, underground service conduits, or for underground living or storage space). Subsidence over a regional area can result from fluid extraction (for water, brine, or hydrocarbons) Uplift or heave of the ground can occur when fluid is allowed to move back into an area from where it was previously extracted and groundwater recharge occurs. This fluid recovery may include injection of water or gas.

Made ground: Made ground comprises anthropogenic deposits of all kinds, including landfill for waste disposal. Depending on its composition and mode of deposition, landfill can be a compressible deposit. If it includes certain types of waste it can be a source of methane, which if uncontrolled can give rise to explosion hazard, or of leachates that have the potential to contaminate surface water or groundwater.

Fluid abstraction: *more…*

Mining: *more…*

Engineering works: *more…*

Compaction of made ground: *more…*

Georisk: The mix of a geohazard with levels of exposure and vulnerability that together constitute a risk.

Hazard
Something with the potential to cause harm.

Intensive risk: The risk associated with the exposure of large concentrations of people and economic activities to intense hazard events, which can lead to potentially catastrophic disaster impacts involving high mortality and asset loss.

Land use planning: The process undertaken by public authorities to identify, evaluate and decide on different options for the use of land, including consideration of long-term economic, social and environmental objectives and the implications for different communities and interest groups, and the subsequent formulation and promulgation of plans that describe the permitted or acceptable uses.

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Mitigation: The lessening or limitation of the adverse impacts of hazards and related disasters.

Natural hazard: Natural processes or phenomenon that may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage.

Preparedness:
a) The knowledge and capacities developed by governments, professional response and recovery organisations, communities and individuals to effectively anticipate, respond to, and recover from, the impacts likely, imminent or current hazard events or conditions.
b) A state of readiness and capacity of human and material means enabling them to ensure an effective rapid response to an emergency, obtained as a result of action taken in advance.

Prevention:
a) The outright avoidance of adverse impacts of hazards and related disasters.
b) Any action that supports Member States in preventing risks or reducing harm to people, the environment and property resulting from emergencies.

Public awareness: The extent of common knowledge about disaster risks, the factors that lead to disasters and the actions that can be taken individually and collectively to reduce exposure and vulnerability to hazards.

Recovery: The restoration, and improvement where appropriate, of facilities, livelihoods and living conditions of disaster-affected communities, including efforts to reduce disaster risk factors.

Residual risk: The risk that remains in unmanaged form, even when effective disaster risk reduction measures are in place, and for which emergency response and recovery capacities must be maintained.

Resilience: The ability of a system, community or society exposed to hazards to resist, absorb, accommodate to, and recover from, the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions.

Response: The provision of emergency services and public assistance during or immediately after a disaster in order to save lives, reduce health impacts, ensure public safety and meet the basic subsistence needs of the people affected.

Risk: 1) The combination of the probability of an event and its negative consequences. 2) The likelihood that harm will be realised. 3) In geohazard terms, a mix of a hazard, and the vulnerability and exposure to that hazard.

Risk assessment: A methodology to determine the nature and extent of risk by analysing potential hazards and evaluating existing conditions of vulnerability that together could potentially harm exposed people, property, services, livelihoods and the environment on which they depend.

Risk management: The systematic approach and practice of managing uncertainty to minimise potential harm and loss.

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Socio-natural hazard: The phenomenon of increased occurrence of certain geophysical and hydrometeorological hazard events, such as landslides, flooding, land subsidence and drought, that arise from the interaction of natural hazards with overexploited or degraded land and environmental resources.

Sustainable development: Development that meets the needs of the present without compromising the ability of future generations to meet their own needs.

Vulnerability: The characteristics and circumstances of a community, system or asset that make it susceptible to the damaging effects of a hazard.

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