**Tectonic Entities**

Previous definition:

~~Tectonic Entitities include continents, supercontinents, tectonic plates, and intraplate tectonic features (provinces), such as cratons/shields (in the continental realm), orogens, sedimentary basins, and tectonised/metamorphosed and/or mineralised regions, as well as large igneous provinces (LIPs).~~

Amended (new):

Tectonic Entitities include the lithosphere, continental and oceanic crust, tectonic plates (that the lithosphere is subdivided into), mid-ocean ridges, orogens, subduction zones, volcanic arcs, continents, cratons/shields, extended crust provinces, tectonised and or metamorphosed provinces, metallogenic (mineral) provinces, igneous provinces (including large igneous provinces), and sedimentary basins. <<< Nick, I’m still not happy with this, as it does not explain what gives rise to a tectonic entity, but quickly finding such a definition/explanation is hopeless!! We will need to refine this ourselves, with Derek’s advice.

sorea:Geosphere

a owl:Class ;

dcterms:source <https://en.wikipedia.org/wiki/Geosphere> ;

skos:definition "The geosphere is the collective name for the lithosphere, the hydrosphere, the cryosphere, and the atmosphere. The different collectives of the geosphere are able to exchange different mass and/or energy fluxes (the measurable amount of change)."@en ;

skos:prefLabel "geosphere"@en ;

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**Lithosphere**

The outer, approximately 100 km of Earth embracing the crust and uppermost mantle, which are relatively rigid, but counter crustal loading by responding flexurally.

Note:

Demonstrates low seismic-wave attenuation, although there is a seismic-velocity discontinuity (Mohorovičić discontinuity, Moho, M-discontinuity) between the lower crust and uppermost mantle). Subdivided into tectonic plates; and underlain by the asthenosphere.

[Adapted from: Sheriff, 2002; Neuendorf et al., 2011; Wikipedia, March 2020]

**Crust (relationship: is part of the lithosphere)**

The uppermost layer of Earth and the upper part of the lithosphere above the Mohorovičić discontinuity (Moho, M-discontinuity) that is seismically characterised by the boundary between the crust and lower lithosphere (uppermost mantle).

Note:

Two types of crust are recognised: continental and oceanic, the former being acidic (granitic/felsic, rich in silicate and aluminium minerals, and thus referred to as sial), and the latter, basic (basaltic/mafic, rich in iron and magnesium silicate minerals, and thus referred to as sima). Sima extends below the continental crust (sial); it is the lower layer of the crust, and, below the sial, it is referred to as the continental sima.

[Adapted from: Sheriff, 2002; Neuendorf et al., 2011; Wikipedia, March 2020]

**Continental Crust (relationship: is part of the crust, which is part of the lithosphere)**

The layer of crust that comprises the continents and their adjacent continental shelf, continental slope, and, if present, the continental rise.

Note:

It is represented by the sial and the continental sima.

[Adapted from: Neuendorf et al, 2011; Wikipedia, March 2020]

**Oceanic Crust (relationship: is part of the crust, which is part of the lithosphere)**

The layer of crust that underlies the oceans.

Note:

It is represented by the sima, which is equivalent to the lower part of the continental crust underlying the sial, and is basaltic/mafic in composition and rich in iron and magnesium silicate minerals.

[Adapted from: Neuendorf et al., 2011, [www.mindat.org/glossary](http://www.mindat.org/glossary), March 2020]

**Tectonic Plate (relationship: is part of the lithosphere)**

A segment of Earth’s lithosphere, which, together with other tectonic plates, comprise the lithosphere.

Note: Composed of the uppermost mantle and both continental and oceanic crust or entirely of overlying oceanic crust. Vary significantly in size and thickness, with boundaries marked by seismic and volcanic activity. Move slowly relative to one another due to convection currents in the upper mantle, and may slide on a boundary with another along transform faults. A plate comprising oceanic lithosphere (entirely or partly thereof), can sink/subduct (in a subduction zone) below another plate, usually a lighter, continental plate. Along mid-ocean ridges and major rifts, plates separate and new crust is formed by upwelling basaltic magma.

AltLabel: lithospheric plate

[Adapted from: Sheriff, 2002; USGS at <https://pubs.usgs.gov/gip/dynamic/tectonic.html>, March, 2020]

**Mid-ocean Ridge (relationship: God help me!! Part of the lithosphere)**

An oceanic mountain and rifting system where plate divergence and seafloor spreading occurs.

Note:

Upwelling, largely basaltic magma creates new seafloor which moves laterally, at varying rates away from the ridge, as upwelling and mantle-convection activity continues. Associated with high seismic activity. Ridge morphology varies depending on spreading rate, degree of magmatic and volcanic activity, and level of stretching and faulting of the adjacent oceanic crust. Seafloor valleys form at slower spreading ridges (e.g., northern Mid-Atlantic Ridge).

altLabel: midocean ridge, MOR

[Adapted from: Neuendorf et al., 2011; Woods Hole Oceanographic Institution at <https://divediscover.whoi.edu/mid-ocean-ridges/types-of-ridges/>, March 2020]

**Subduction Zone [relationship: ??, as extends from the lithosphere (oceanic crust) into the underlying upper mantle]**

Zones located at boundaries of convergent oceanic-oceanic plates or convergent oceanic-continental plates where one plate subducts/sinks into the mantle beneath the other. Oceanic to continental plate convergence results in the dense oceanic plate subducting beneath the less dense continental plate.

Note:

‘Subduction zones are the descending limbs of mantle convection cells’ (Stern, 2002). Associated with significant seismic activity, volcanic arcs, deep oceanic trenches, accretionary prisms, and belts of deformation and metamorphism. <<<< needs further development

[Adapted from: Sheriff, 2002; Stern, 2002; Wikipedia, March 2020]

**Volcanic Arc (relationship: is part of lithosphere, either continental or oceanic)**

A chain of volcanoes that forms above a subduction zone at a convergent plate boundary.

[DiPietro, 2013]

**Volcanic Island Arc (relationship: is a type of volcanic arc; forms in the lithosphere in the oceanic realm, i.e., where there is oceanic crust)**

A volcanic arc that forms in an ocean basin above a subduction zone at convergent ocean (ocean-ocean) plate boundaries.

[DiPietro, 2013]

**Continental Volcanic Arc (relationship: is a type of volcanic arc; forms in the continental lithosphere, i.e., where continental crust occurs)**

A volcanic arc that forms along the margin of a continent where oceanic crust subducts beneath continental crust.

[DiPietro, 2013]

**Present-day Continent (relationship: part of lithosphere and contains continental crust)**

A large, existing landmass, comprising continental crust and embracing exposed land above sea level (Zealandia being an exception), and, below sea level, based on major differences in the inclination of the bathymetric surface, the attendant continental shelf, continental slope, and, if present, the continental rise.

ScopeNote:

One of several landmasses on Earth. Up to eight identified depending on their various groupings, which are, in part, geopolitical and are not fully classified with strict criteria: Africa, North America, South America, Europe, Asia, Antarctica, Australia and Zealandia. Europe and Asia are commonly and collectively termed Eurasia, and North America and South America are commonly referred to as the Americas or the American Continent. Zealandia (the New Zealand Continent), in isolation from Australia following its breakup from eastern Gondwana during the Late Cretaceous, is now recognised as a *geological* continent, with submergence of 94% of its continental crust.

(Modified and compiled from: Burke & Drake, 1974, Sheriff, 2002; Mortimer et al., 2017; Wikipedia, March 2020)

**Ancient Continent (as above)**

A continent that has been recognised geologically in the past as a distinct entity and not as a supercontinent, and, is not recognised as a present-day continent, although it may form part of one or more (present-day continents). <<< requires further work

**Supercontinent (relationship: see notes below)**

Defined previously, but here with relationships:

* Comprises continental crust
* Because of mantle convection and heat anomalies that build up slowly below the mantle-insulating continental lithosphere (relative to the less insulating oceanic lithosphere), continents go through a prolonged cycle (Wilson Cycle) of formation into a supercontinent which subsequently breaks up into continents again. Continents after breakup are generally not the same as those before (a bit of licence here).

**Craton (relationship: see notes below)**

Defined previously, but here with relationships:

* As noted previously, cratons include shield areas (no covering rocks) and platform areas (with covering rocks). There seems to be a bit of licence re use of the terms: craton and shield. In Australia, we generally do not use the term shield, but some do apply it to WA (but not GA).
* A supercraton is made up of a number (at least two) of old cratons that were subsequently amalgamated, but a very long time ago

**Extended Crust Province (relationship: part of lithosphere—continental crust)**

A province of thinned crust (>50 %) due to extension (e.g., the Basin and Range Province of the Western United States and northwestern Mexico.

Note:

The Basin and Range Province is associated with ongoing tectonic extension since the early Miocene and is characterised by alternating narrow faulted mountain chains and flat arid valleys/basins, overall displaying abrupt changes in elevation.

[USGS: <https://earthquake.usgs.gov/data/crust/definitions.html>; Wikipedia; both accessed march 2020]