Orogen - long belt of deformed/metamorphosed rocks, formed by compression, originally as mountain ranges but may be called orogens after topographic relief is eroded away.

Form when:
- Subduction causes horizontal compression of over-riding plate (Andean type) also called Non-Collisional
- Two plates collide without one subducting under the other (cases where both bodies are roughly equivalent in buoyancy). Two blocks may be continental crust, either large continents or small fragments, (Himalaya-type) or island arcs formed in an ocean-ocean subduction zone (Taiwan).

Properties of the colliding blocks control orogenic geometry - as they usually do, strain localization favoured where lithosphere is strong, broad distributed deformation where it's weak.

Collisions often result in suturing - when two blocks become welded along the collision zone - this is how large continents are built through the addition of lots of small blocks of lithosphere. Big (and small) continents are a mosaic of different blocks of different age and origin - called Terranes - which are overlain and separated by rocks formed/deposited in situ during collision (sometimes called Mobile Belts).

THIN VS THICK SKINNED DEFORMATION
Two end-member geometries are presented in compressional orogens -

Thin skinned: when deformation is concentrated above a major low-angle detachment or décollement fault, with the footwall translating underneath it without accommodating significant shortening. Hanging wall structures tend to be listric to the décollement. An accretionary wedge is a good example of this type of belt. This kind of setting is not very good at exhuming metamorphic rocks, and increases in width with time.

Thick-skinned: when the faults cut down through the entire crust, often through the lithospheric mantle as well. The entire rigid lithosphere is involved in deformation. Faults are much more steeply dipping and are effective at exhuming higher grade metamorphic rocks. Uplift can be quite localized in a narrow belt of structural deformation.

Both geometries are often seen in the same orogen, with the central uplift (thick-skinned) flanked on both sides with thin-skinned fold/thrust belts that verge away from the orogen.

CONTINENTAL SHORTENING ABOVE A SUBDUCTION ZONE

In some subduction zones, significant structural shortening is accommodated by the formation of fold and thrust belts in the overriding plate. The Andes is a modern example, where the subducting slab is quite flat (shallowly dipping) under the South American continent and is strongly coupled to the underside of the plate. This coupling transfers horizontal compressional stress into the plate above.

EXAMPLE OF OLD OROGENS - Cordillera/Nevadaplano, MOZAMBIQUE

See online lecture graphics for details.