

# Cryosols: Soils in ice-cold environments

Cryosols (or Gelisols as they are defined in USDA Soil Taxonomy) are soils which contain ice or permafrost (temperatures below 0°C for at least two consecutive years). The cold climate has a dominant impact on soil formation and properties. Cryosols are found in the Arctic in Canada, Russia, Alaska, and Norway, as well as in Antarctica and some high altitude areas such as the Himalaya and the Tibet Plateau. Cryosols form on parent materials ranging from glacial tills through bedrock to organic peat materials. In the Arctic cryosols support a wide range of plant and animal life and they underpin important summer breeding grounds for many migratory birds. In the Antarctic plant life is much scarcer and limited to just two species of flowering plants that occur on the Antarctic Peninsula (the warmest and wettest region of Antarctica). Over much of the Antarctic continent plant life on cryosols is limited to occasional patches of mosses (where there is some liquid water available in the summer) and lichens that are tolerant of extreme cold and dry conditions.

The following websites have more detailed information about Cryosols or Gelisols:

<http://www.fao.org/docrep/003/y1899e/y1899e13.htm>

[http://www.isric.org/sites/default/files/major\\_soils\\_of\\_the\\_world/set10/cr/cryosol.pdf](http://www.isric.org/sites/default/files/major_soils_of_the_world/set10/cr/cryosol.pdf)

<http://www.britannica.com/EBchecked/topic/707513/Cryosol>

<http://en.wikipedia.org/wiki/Gelisol>



A cryoturbated Cryosol from Russia (Photo: George V. Matyshak). Right Landscape where the predominant soils are Cryosols in the Northern Ural Mountains, Russia (Photo Megan Balks).

Some Cryosols in Antarctica form in cold desert conditions where there is insufficient moisture to



ice-cement the soil. Left: Scientists studying soil in the Beardmore Glacier Region of Antarctica at about 85 °S. (Photo: Errol Balks).

Right: A profile of a “dry-permafrost” cryosol in the McMurdo Dry Valleys region of Antarctica. (Photo: Megan Balks).