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The Polish Tatras seen from the north. The iconic and extremely popular Mount Giewont can be seen along with the Red Peaks Massif lying on the main ridge.

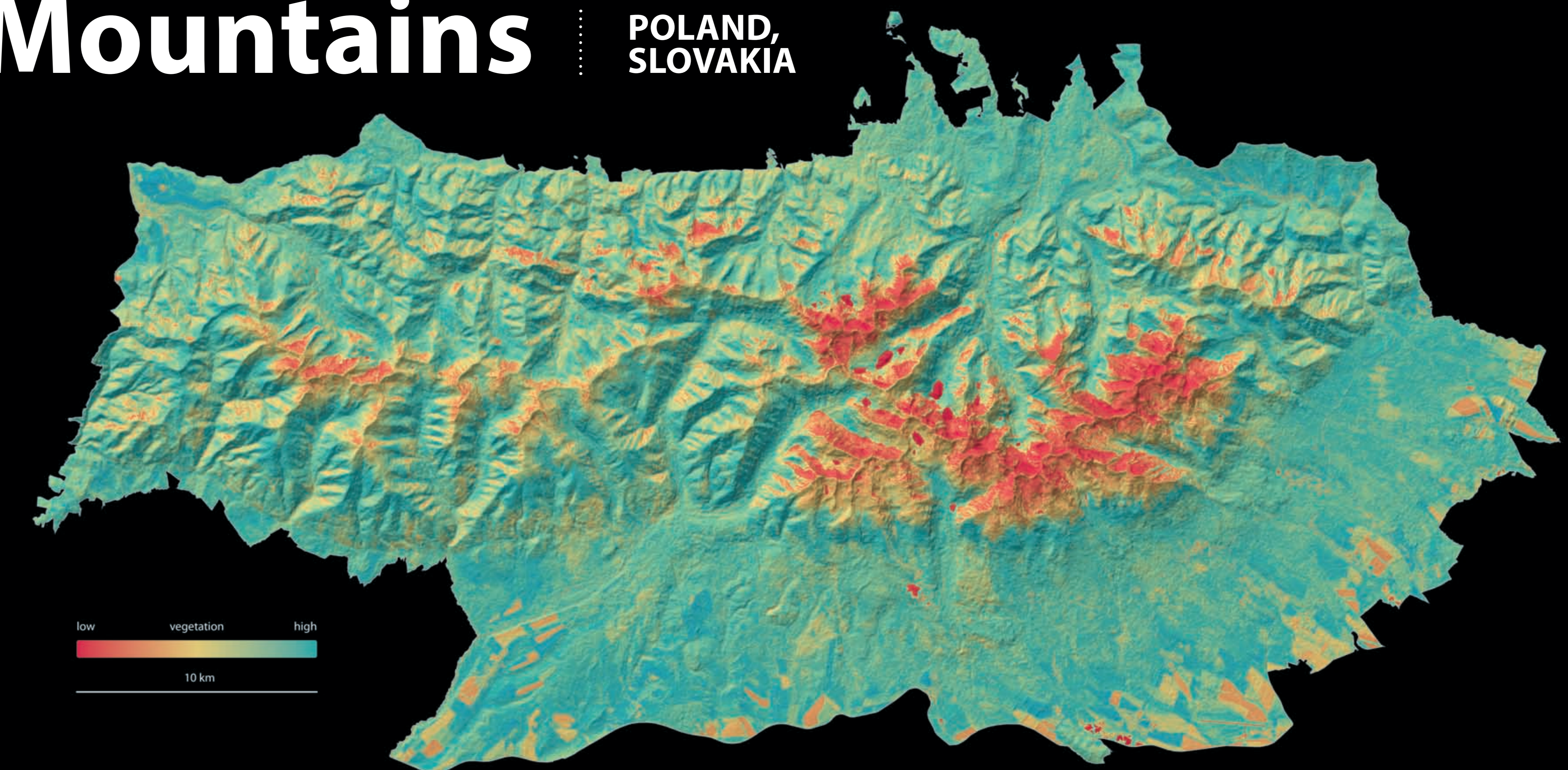
# The Tatra Mountains

POLAND, SLOVAKIA

The Tatra Mountains straddle the border between Poland and Slovakia and are part of the larger Carpathians mountain range. With an area of just under 800 km<sup>2</sup>, they are often referred to as the smallest high mountain range in the world. They are protected by two national parks, one in Slovakia and one in Poland; both are part of the Natura 2000 network and are included within a UNESCO Biosphere Reserve.

The Tatras boast over 1,300 plant species, found in the mixed coniferous forests, dwarf pine shrubs, alpine meadows and sparse vegetation enduring among rocks and screes at higher altitudes. Wildcats, lynx, wolves, brown bears and the local subspecies of both the chamois and the marmot inhabit these mountains, while golden eagles, eagle owls, western capercaillie and black grouse are but some of the birds found here.

Around two thirds of the Tatras are covered by forest. Unsustainable forestry practices (primarily in the nineteenth century and lasting until the 1930s) resulted in the widespread planting of Norway spruce in lieu of natural mixed beech-fir forest in the lower montane zone. This created forests with low diversity – a forest ‘monoculture’, which tends to be less resistant to climate change, windstorms, bark beetle outbreaks or other disturbances, such as air pollution or water shortages. As a result, the Tatras have experienced massive dieback events of Norway spruce over the past few decades. Seen as a calamity



from a human perspective, such dieback nevertheless gives nature a chance to recover and gradually return to the more natural mixed forest ecosystems.

ECOPOTENTIAL offers the opportunity to study these processes by offering remote sensing tools which, supported by aerial imagery and ground observations, enable the health of forests and the dynamics of disturbance and subsequent ecosystem recovery to be monitored.

The above image shows the Normalised Difference Vegetation Index (NDVI) of the two national parks which encompass the Tatra Mountains, acquired in October 2017 by Sentinel 2. Green/turquoise areas in the image indicate areas where vegetation is in good condition. Yellow areas indicate poorer vegetation conditions due to phenology or ecosystem disturbances. Red areas indicate areas with little to no vegetation, mainly found in the high altitudes where one finds sparse vegetation, rocks and water bodies. Satellite imagery can be complemented with ground measurements for a more precise analysis.

Produced for ECOPOTENTIAL by Levi Westerveld (GRID-Arendal) from ESA remote sensing data (Sentinel 2) – 02 October 2017.

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Brown bear (*Ursus arctos*)



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Kościeliska Valley in the Polish Tatras. Spruce monocultures in the lower montane zone flank the valley meadow.



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The same area after a windstorm in 2013.