

The geographical situation of a continent on the globe, the resulting climatic conditions with their seasonal variations of sunshine, temperatures and precipitation, but also the properties of the surrounding seas, define the conditions for vegetation, be it natural or influenced by mankind. As a consequence the conditions for human settlement are defined as well. Regions with common properties (climate, topography, geology, vegetation ...) form landscapes, which in many cases can be easily separated from others also in a satellite image map.

The page provides a combination of a satellite image map (Envisat MERIS) of Europe with typical weather satellite images, precipitation maps and vegetation index maps covering summer and winter.

Purpose:

- To understand the distribution, sizes and properties of the major landscapes of Europe;
- to assess climatic peculiarities of the continent;
- to demonstrate seasonal differences and their reasons;
- to demonstrate the relation between climate and vegetation;
- to analyse the impact on the population.

Map Descriptions

Map 1: Landscape zones of Europe

Satellite/Sensor: Envisat MERIS
Acquisition Date: Jul.-Sep. 2002-04
Band Combination: near real colour
Map Information: Landscapes

Description: In the satellite image map the view of Europe is dominated by the distribution of vegetation and its phenology. The map is composed of data acquired mainly in July and August. A large part of the agricultural land has been harvested, and thus it can be easily separated from forests (dark green), grassland (bright green), steppes, and the semi-arid regions around the Mediterranean Sea. At the same time the distribution of vegetation highlights the relief and the settlement density. The labels provide the relation between vegetation cover, topographical features and the geographical units assigned to them, the boundaries between these landscapes are in many cases not strictly defined.

Map 2a: Europe, Meteosat 7 image, 31 Dezember 2004

Satellite/Sensor: Meteosat-7
Acquisition Date: 31.12.2004
Band Combination: near real colour
Map Information: -

Description: The Meteosat image shows a typical winter situation over Europe – low pressure zones over the Atlantic Ocean and the Mediterranean Sea, and a dense cloud cover stretching across Western and Central Europe. In regions north to the Polar Circle (e.g. northern Scandinavia) the night lasts 24 hours (polar night). Only the infrared band of Meteosat carries information for these areas (see also Atlas pages 150/151).

Map 2b: Europe, Meteosat 8 MSG image, 25 July 2004

Satellite/Sensor: Meteosat-8
Acquisition Date: 25.07.04
Band Combination: near real colour
Map Information: -

Description: The Europe section of the Meteosat image shows a typical weather situation in summer. Solar irradiation in Europe is near its maximum, north of the Polar Circle the sun shines 24 hours (midnight sun). The belt of cloud systems has moved northwards. The image shows southern Europe cloud-free, with a front system departing to the east and a low pressure zone with its characteristic cyclone shape arriving from the Atlantic Ocean in the west.

Map 3a: Average precipitation December to February

Satellite/Sensor: -
Acquisition Date: -
Band Combination: -
Map Information: Average precipitation Dec.-Feb., main wind directions.

Description: The European climate is strongly influenced by the Atlantic Ocean. In winter, westerly winds cause heavy precipitation along the west coast of Ireland, the United Kingdom, Norway and Spain. In higher altitudes and in the main parts of Europe precipitation falls as snow. Along the Mediterranean coast high amounts of rainfall are due to storm events.

Map 3b: Average precipitation June to August

Satellite/Sensor: -
Acquisition Date: -
Band Combination: -
Map Information: Average precipitation June-Aug., main wind directions.

Description: Europe is strongly influenced by westerly winds. During the summer months humid air from the Atlantic Ocean leads to precipitation even far into the east of the continent. Southern Europe is cut off by the mountain ranges of the Alps, the Pyrenees and the Cantabrian Mountains.

Map 4a: Vegetation – January 2004

Satellite/Sensor: SeaWiFS
Acquisition Date: January 2004
Band Combination: -
Map Information: NDVI

Description: The NDVI reflects the vegetation intensity. The NDVI is related to the distribution of the precipitation (Map 3a) and the surface relief as well as the average temperatures (Atlas page 30). North of the polar circle no NDVI can be derived for the winter season due to the polar night, during which no information in the red spectral range can be obtained. The south-western part of the Iberian peninsula and the North African coast are greener during winter. Areas covered by snow appear in a brown colour, similar to desert.

Map 4b: Vegetation – July 2004

Satellite/Sensor: SeaWiFS
Acquisition Date: July 2004
Band Combination: -
Map Information: NDVI

Description: During the summer months the NDVI of Europe is relatively homogeneous. Only semi-arid regions in the south, some bare tops of mountain ridges and the interior of Iceland show low or no vegetation. The accumulation zones along the major mountain ridges such as the Carpathian

Mountains, which lead to increased precipitation, can be identified both in the precipitation map (3b) and in the NDVI.