

## Sea Surface Temperature SST

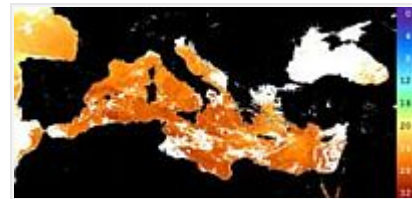
Every day since February 1993, DFD is generating from different NOAA-AVHRR sensors (starting with NOAA-11) daily sea surface temperature products for three European locations. Currently, three daytime and three night-time NOAA-17 scenes are used.

Simultaneous measurements in two thermal infrared spectral ranges make it possible to correct for atmospheric influences. The scenes have a radiometric resolution of 0.125 ° C and a geometric resolution of about 1.1 km in the center of the map; Mercator projection is used.

Weekly and monthly thematic synthesis products are derived from this daily operational product, at each step becoming successively free of clouds.

### Mediterranean and Black Seas

This image shows average temperatures of the last week, based on a synthesis of daily maxima scenes. Processing of 42 individual scenes was required at DFD for generating weekly composites. Only values between 0 and 32 degrees C have been colour coded, in order to accent the temperature distribution.



Mediterranean and Black Seas

High levels of irradiance in the eastern Mediterranean (particularly near the Turkish Adriatic, the Sinai Peninsula and the Gulf of Sidra) are responsible for the high temperatures there. The western Mediterranean is cooler, with a noticeable temperature drop between the Golfe du Lion and Corsica. This is caused by the Mistral, a cold wind funnelled down the Rhone Valley which pushes the surface water away from the coast, thereby permitting cooler water to rise from the depths in a process known as "up welling."

The relatively higher rate of evaporation in the eastern Mediterranean, especially in the summer, causes a surface current of Atlantic water to flow into the Mediterranean through the Strait of Gibraltar. Heavier, salty water deeper down flows in the other direction, out of the eastern Mediterranean and into the Atlantic. As in this image, eddies caused by the temperature, salinity and density gradients are often visible here.

### North Sea, Baltic Sea, North-eastern Atlantic

This image shows mean temperature distribution of the last week, derived from daily maxima for up to five individual scenes. A total of about 42 individual scenes were processed for this image. Only values between 0 and 32 degrees Celsius have been colour coded, in order to accent the temperature distribution. The white areas are either clouds or sea ice.



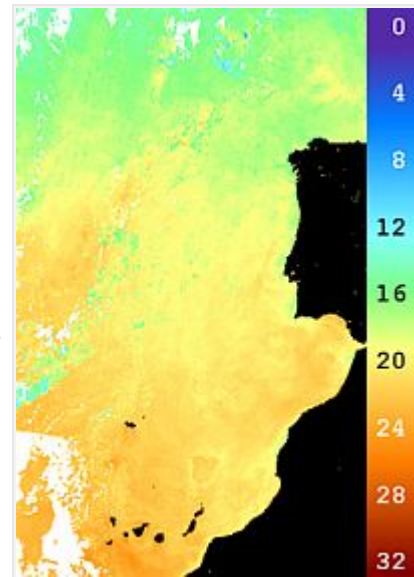
North Sea, Baltic Sea, North-eastern Atlantic

Here the sea surface temperature is influenced by North Atlantic ocean currents, which are responsible for distinct temperature zones. Coming from the southwest, the Gulf Stream transports warm (up to 14 degrees C), highly saline surface water up the coast of Norway almost to the 70th parallel, where it greatly influences the local climate. In the other direction, the East Greenland current transports a cold volume of water from the north down along the east coast of Greenland southward. A side arm north of Iceland moving eastward accounts for high temperature gradients east of Iceland on the Arctic front. The North Sea and Baltic Sea warm up considerably during the frequent high pressure periods at this time of the year.

## Atlantic near Madeira and the Canary Islands

The image shows monthly mean temperature distribution, derived from daily maxima for up to three individual scenes.

Along the coasts of Morocco, Portugal and northern Spain, frequent seaward winds (in the case of Morocco the north-eastern trade winds) force warm surface water away from the coast, allowing colder water to rise to the surface in a process known as upwelling. The effects can be seen in this image. Because of its high nutrient content, this colder water greatly influences the local ocean ecology and ultimately has economic consequences for the fishing industry. West of the Canary Islands a temperature maximum can be noted, in keeping with the season.



Atlantic near Madeira and the Canary Islands

## Land Surface Temperature LST

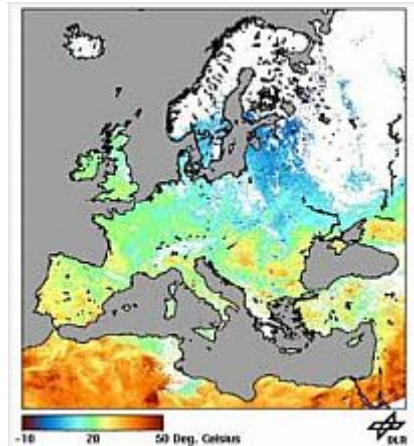
DFD has just expanded its service of providing easy public access to regularly updated satellite images. Daily maps showing daytime and night-time European land surface temperatures can now be viewed via EOWEB, DFD's Intelligent Satellite Data Information System.

This service complements the collection of operationally produced satellite images of Europe's seasonal progression of vegetation (NDVI), sea surface temperatures, and weather, processed from data relayed by the Advanced Very High Resolution Radiometers (AVHRR) flying on U.S. NOAA satellites.

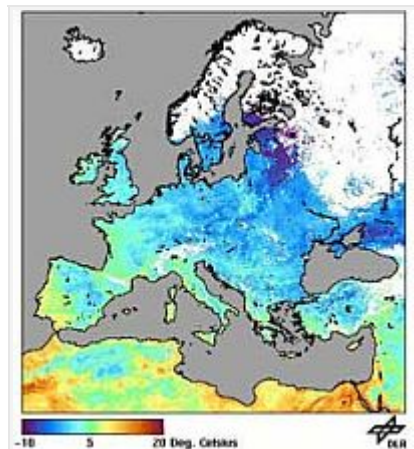
This unique presentation of land surface temperatures can be used for many applications in the geosciences, whether for scientific studies or as an aid in making practical decisions related to climate or geography. Examples are determining the agricultural suitability of particular regions, or monitoring the moderating influence of vegetation on temperature. The value of this approach has already been confirmed in the German state of Rheinland-Pfalz, where environmental and planning authorities made use of DFD's thermal maps in land use studies.

Remote sensing of surface temperatures from instruments located in space offers the significant advantages of systematic, consistent, global collection of data which can then be made available worldwide, rapidly and continuously. Calculating ground temperatures on an operational basis from these data is, however, a complex task, since surface temperatures are dependent on the kind of land cover and on changes to the vegetation over time. This auxiliary information is obtained from relevant ten-day NDVI composites produced for this purpose at DFD.

The procedure developed at DFD for the routine generation of maps with afternoon and maximum nighttime land temperatures for all of Europe involves processing and combining for each data product three afternoon or three nighttime images for each day. For overlapping pixels, the one recorded under the potentially best atmospheric conditions is used (for daytime the selection criterion is the pixel with the maximum NDVI value, for night the pixel with the maximum temperature value). The two resulting daily composites provide a new information base on day and night temperature differences, which is an important climate parameter. In addition, weekly and monthly mean daytime and night-time images are available.



Land Surface Temperature (LST)  
NOAA AVHRR Daytime Aquisitions  
1-Week Composite: 31-Mar-2003 to 06-Apr-2003



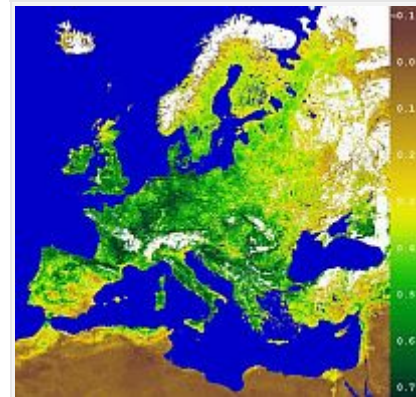
Land Surface Temperature (LST)  
NOAA AVHRR Nighttime Aquisitions  
1-Week Composite: 31-Mar-2003 to 06-Apr-2003

## Normalized Differential Vegetation Index NDVI Europa

Every day, three successive NOAA-17 scenes are used to derive a synthesis product in stereographic projection known as the "Normalized Difference Vegetation Index" for Europe and North Africa. It is calculated by dividing the difference in technical albedo between measurements in the near infrared and visible red part of the spectrum by the sum of both measurements. This value provides important information about the "greenness" and density of vegetation.

Weekly and monthly thematic synthesis products are derived from this daily operational product, at each step becoming successively free of clouds.

All these products are available through EOWEB.



European Vegetation Index  
(NDVI)

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