

EEA Core Set of Indicators - CSI 012  
**Global and European temperature**  
May 2005 assessment

working draft

**About this document**

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If you would like to see further background information about this indicator, you can see the published specification at:

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**Key policy question: Will the increase of the global average temperature stay within the target of 2 degrees Celsius above pre-industrial level by 2100, and will the rate of increase of the global average temperature stay within the proposed target of 0.2 degree Celsius per decade?**

**Key message:**

- The increase in global mean temperature, observed over the last decades, is unusual in terms of both magnitude and rate of change. The temperature-increase up to 2004 was about 0.7 +/- 0.2 degrees Celsius compared to pre-industrial level, i.e. about 1/3 of the EU policy target of 2 degrees Celsius.
- The current global rate of change is about 0.18 +/- 0.05 degrees Celsius per decade, a value probably exceeding any 100-year average rate of warming during the past 1000 years. Under different climate scenarios the indicative target of 0.2 degrees Celsius per decade is likely to become exceeded in the next decades.

The Earth and Europe have experienced considerable temperature increases in the last 100 years (Figure 1), especially in the most recent decades.

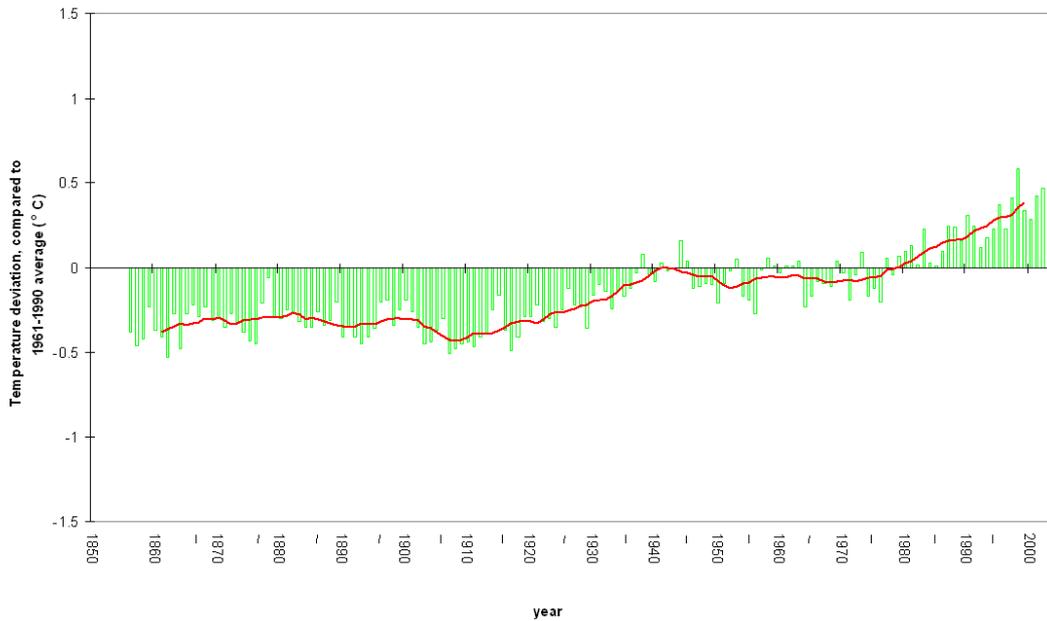
Globally, the temperature increase up to 2004 was about 0.7 +/- 0.2 degrees Celsius compared to pre-industrial levels, i.e. about 1/3 of the EU "sustainable " target of limiting global average warming to not more than 2 degrees Celsius above pre-industrial levels. These changes are unusual in terms of both magnitude and rate of change (Figure 2). The 1990s were the warmest decade on record, and 1998 was the warmest year, followed by 2003, 2002, and 2004 (Jones and Moberg, 2003, WMO, 2003).

The global mean temperature is likely to increase by 1.4-5.8 degrees Celsius between 1990 and 2100, assuming no climate change policies beyond Kyoto and taking the uncertainty in climate sensitivity into account (IPCC, 2001). Considering this projected range, the EU target might become exceeded between 2040 and 2070.

The rate of global temperature increase is currently about 0.18 +/- 0.05 degrees Celsius per decade, which is close to the indicative target of 0.2 degrees Celsius per decade.

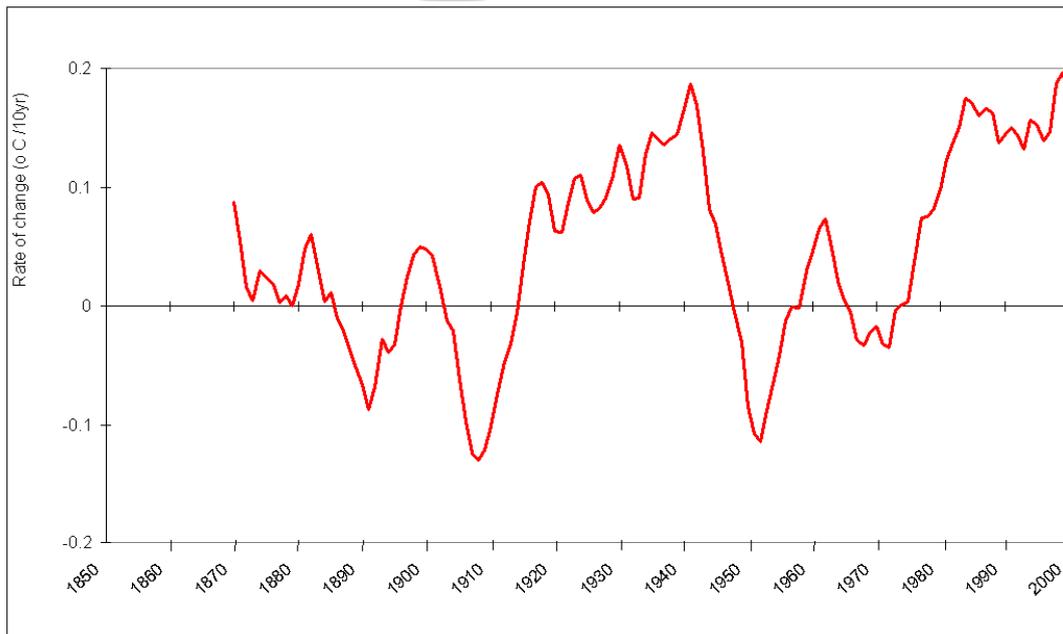


Fig. 1: Global annual average temperature deviations, 1850-2004, compared to the 1961-1990 average (in degrees Celsius)



Data source: KNMI, Climate Research Unit (CRU), <http://www.cru.uea.ac.uk/cru/data/file/tavegl.dat>

Fig. 2: Global average rate of temperature change (in degrees Celsius per decade)

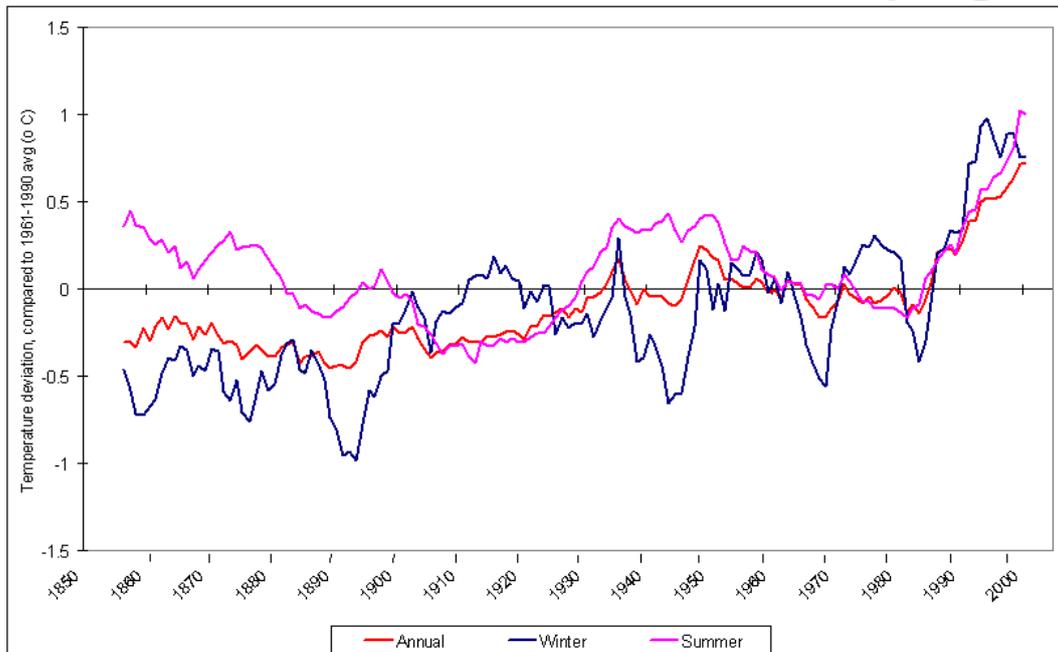


Data source: KNMI, Climate Research Unit (CRU), <http://www.cru.uea.ac.uk/cru/data/file/tavegl.dat>



## Specific policy question: What is the trend and rate of change in the European annual and seasonal temperature?

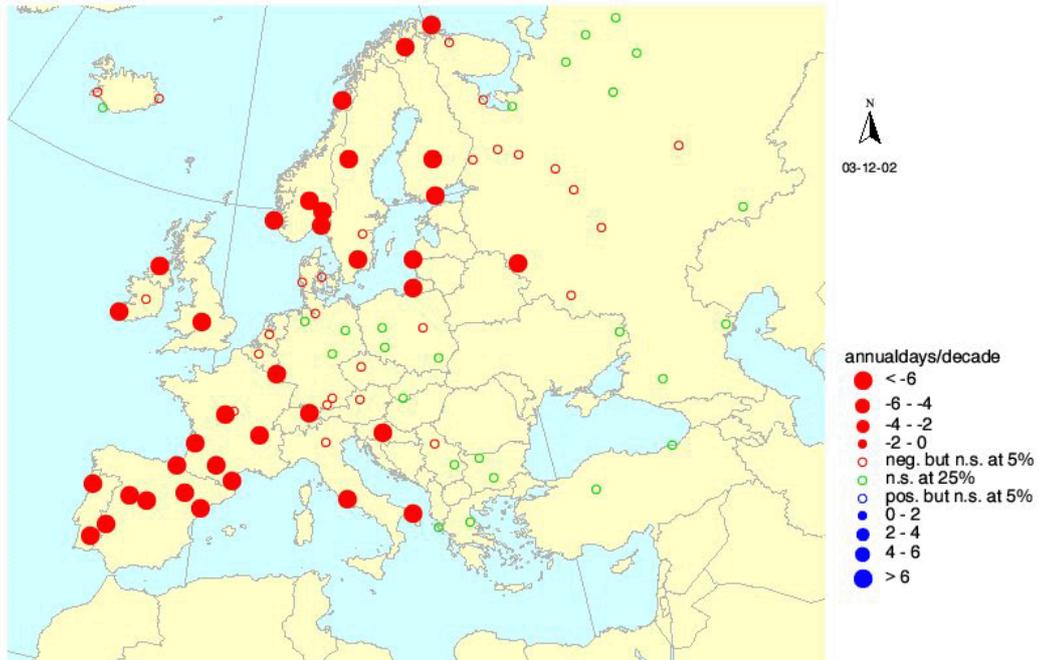
Fig. 3: European annual, winter and summer temperature deviations (in degrees Celsius, expressed as 10 year mean compared to 1961-1990 average)



Data source: KNMI, (<http://climexp.knmi.nl>) based on Climate Research Unit (CRU), file CruTemp2v



Fig. 4: Change in frequency of cold days in Europe, in the period 1976-1999 (in days per decade)

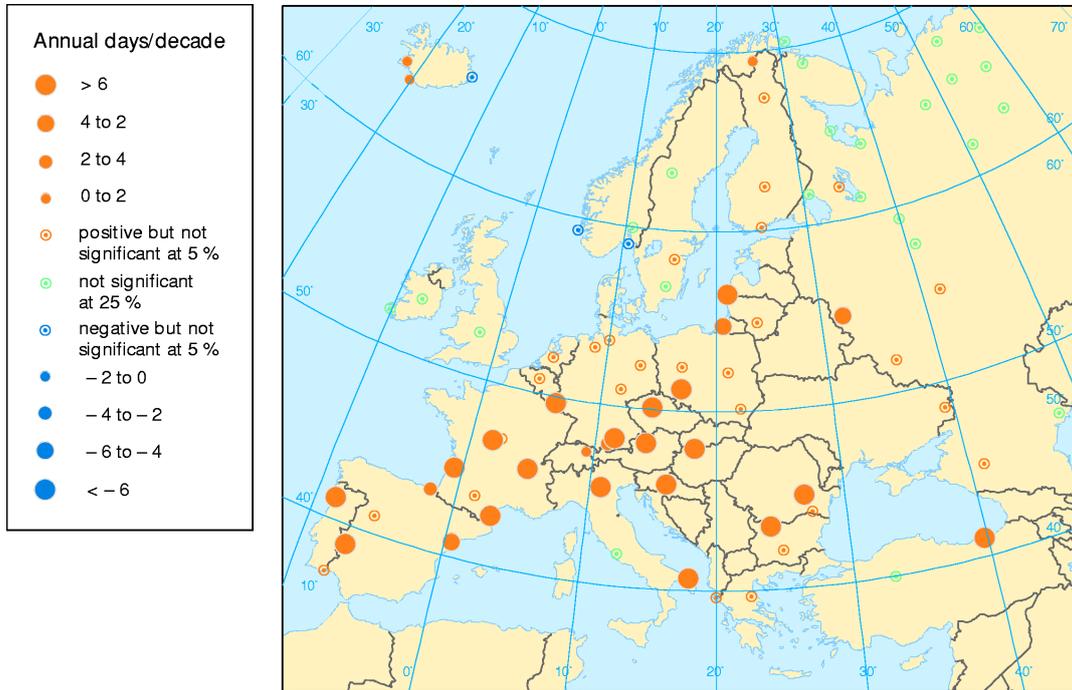


**Data source:** Klein Tank et al., 2002 (<http://eca.knmi.nl/>)

**Note:** Positive values indicate increase and negative values indicate decrease in temperature (in degrees Celsius per decade). The circle size depicts the magnitude of change in temperature per decade.



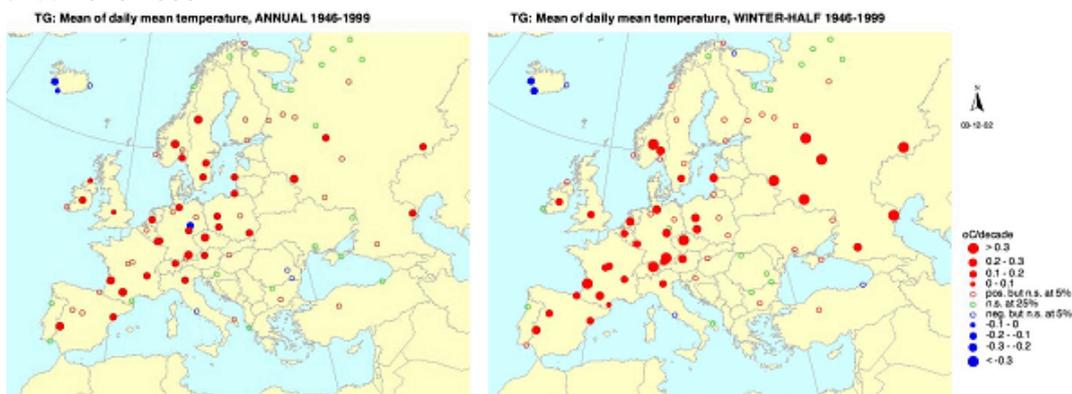
Fig. 5: Change in frequency of summer days (days with temperatures above 25 degrees Celsius)



Data source: Klein Tank et al., 2002 (<http://eca.knmi.nl/>)

Note: Positive values indicate increase and negative values indicate decrease of annual summer days per decade. The circle size depicts the magnitude of change in summer days per decade.

Fig. 6: Trends in annual (left) and winter (right) temperature (in degrees Celsius) in Europe for the period 1946-1999.



Data source: Klein Tank et al., 2002 (<http://eca.knmi.nl/>)

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Fig. 7: Changes in duration of heat waves in Europe, in the period 1976-1999 (both in days per decade)

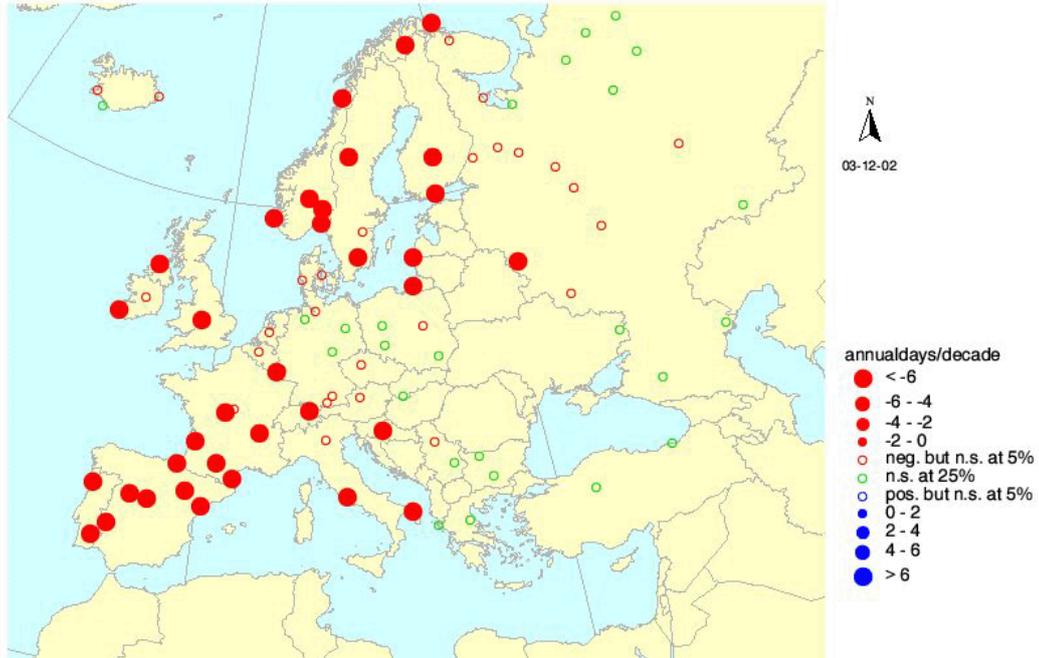


Data source: Klein Tank et al., 2002 (<http://eca.knmi.nl/>)

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Fig. 8: Change in frequency of cold days in Europe, in the period 1976-1999 (in days per decade)



Data source: Klein Tank et al., 2002 (<http://eca.knmi.nl/>)