

## B-2: Atmospheric precipitation

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## 1) General description

### 1.1) *Brief definition*

Precipitation (the total volume of water precipitated to a certain surface area for a given period of time) means water, in either liquid or solid state, falling out of the clouds or depositing from the air on the land surface, on various materials or plants. Atmospheric precipitation may take the form of rain, drizzle, snow, sleet, snow pellets, small hail or hail.

### 1.2) *Units of measurement*

Linear depth of the precipitated water in millimetres (mm) and as a percentage of long term average precipitation (%).

### 1.3) *Context*

Relation to other indicators from the Guidelines: This indicator relates to indicators "B-1: Air temperature" and „B-3: GHG emissions“.

## 2) Relevance for environmental policy

### 2.1) *Purpose*

The indicator provides a measure of the state of the climate system as well as the impact of precipitation on the change in quantity of surface waters and ground waters and on soil and biota. Analysis of the perennial sets of the main climate formation characteristics, such as atmospheric precipitation, air temperature and air humidity, makes it possible to evaluate the precipitation structure change in a certain area and to assess the dynamics of past and future changes in precipitation volumes and related changes in climate.

## **2.2) Issue**

Atmospheric precipitation is one of the most important characteristics of climate. Atmospheric precipitation generates renewable freshwater resources (surface waters and ground waters) and thus influences the state of all components of the environment (soil, forests, fauna and flora). The volume, quality and distribution of atmospheric precipitation as well as its seasonal and annual distribution are very significant for agriculture and forestry. In addition, the quantity of atmospheric precipitation influences the state of ambient air by regulating its humidity, and it limits the dispersion of suspended particulate matter in lower layers of the atmosphere.

## **2.3) International agreements and targets**

### *a) Global level:*

The World Meteorological Organization (WMO) facilitates worldwide cooperation in establishing and operating networks of meteorological stations, including observations of atmospheric precipitation and hydrological, meteorological and other geophysical observations. The member countries of the Global Climate Observing System (GCOS) and the GCOS Upper-Air Network (GUAN) are obliged to ensure the operation of observation stations included in regional backbone monitoring networks. The Parties to the United Nations Framework Convention on Climate Change (UNFCCC) have to carry out systematic observations of changes in atmospheric precipitation volumes and ensure the creation of databases.

### *b) Subregional level:*

On the European level, the European Union takes the lead in climate change related issues including reduction of GHG emissions and has established a General Directorate "Climate Action" within the European Commission. The 2nd European Climate Change Programme has been launched in 2005 followed in 2011 by the "Roadmap for moving to a competitive low-carbon economy in 2050". In 2009, the White Paper "Adapting to climate change: Towards a European framework for action" was adopted.

## **3) Methodology and guidelines**

### **3.1) Data collection and calculations**

Collection of data on the quantity of atmospheric precipitation should be carried out by the network of meteorological stations. National hydro-meteorological services process the data,

assessing their quality and consistency and calculating monthly and annual mean values. Special adjustments are made for “wetting” and for “wind losses”. Daily, monthly and annual precipitation quantities are determined. The relationship of the precipitation quantity for a given year to the long term average precipitation (for the time period 1961-1990) is calculated as a percentage according to the following formula:

$$\text{Annual deviation from the long-term average precipitation (\%)} = \left( \frac{\text{Annual precipitation}}{\text{Long term average precipitation for 1961 – 1990}} \right) - 100$$

### **3.2) Internationally agreed methodologies and standards**

The best practices and concepts for climate monitoring developed by GCOS; *Guide to Meteorological Instruments and Methods of Observation* prepared by the Main Geophysical Observatory in coordination with WMO.

## **4) Data sources and reporting:**

Systematic observation of the quantity of atmospheric precipitation is carried out by the institutions responsible for meteorology or hydrometeorology in countries of South-Eastern and Eastern Europe, Caucasus and Central Asia. Data on meteorological observations are published regularly via different media. All target countries are members of the WMO, and Parties to the UNFCCC. As part of their reporting obligations as parties to the UNFCCC the countries prepare reports on the results of air temperature measurements and include this information regularly in their national communications.

## **5) References at the international level:**

- Convention of the WMO (1950);
- United Nations Framework Convention on Climate Change (1992);
- *World Weather Records* volumes on the regions for various decades;
- Intergovernmental Panel on Climate Change (IPCC) Special Report, Climate Change Consequences for the Regions: Vulnerability Assessment. Summary for decision-makers. IPCC, 1997. ISBN 92-9169-410-4;
- Climate Change and Water, IPCC Technical Report VI, Geneva 2009 (in English and Russian):
- [http://ipcc.ch/publications\\_and\\_data/publications\\_and\\_data\\_technical\\_papers.shtml#.URTa4bhaUk](http://ipcc.ch/publications_and_data/publications_and_data_technical_papers.shtml#.URTa4bhaUk);
- Guide to Meteorological Instruments and Methods of Observations; WMO-No-8, 2008, updated 2010: [http://library.wmo.int/pmb\\_ged/wmo\\_8\\_en-2012.pdf](http://library.wmo.int/pmb_ged/wmo_8_en-2012.pdf)

- White paper: Adapting to climate change: Towards a European framework for action; COM(2009) 147 final: <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2009:0147:FIN:EN:PDF>;
- WMO: <http://www.wmo.int>;
- UNFCCC: <http://www.unfccc.int>;
- IPCC: <http://www.ipcc.ch>;
- European Commission – General Directorate Climate Action: <http://ec.europa.eu/clima/>;
- [A-2-en-final.doc](#)
- EEA: <http://themes.eea.europa.eu/IMS/CSI>.