



Recommendation ITU-R P.837-7
(06/2017)

**Characteristics of precipitation
for propagation modelling**

P Series
Radiowave propagation



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Foreword

The role of the Radiocommunication Sector is to ensure the rational, equitable, efficient and economical use of the radio-frequency spectrum by all radiocommunication services, including satellite services, and carry out studies without limit of frequency range on the basis of which Recommendations are adopted.

The regulatory and policy functions of the Radiocommunication Sector are performed by World and Regional Radiocommunication Conferences and Radiocommunication Assemblies supported by Study Groups.

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Series of ITU-R Recommendations

(Also available online at <http://www.itu.int/publ/R-REC/en>)

Series	Title
BO	Satellite delivery
BR	Recording for production, archival and play-out; film for television
BS	Broadcasting service (sound)
BT	Broadcasting service (television)
F	Fixed service
M	Mobile, radiodetermination, amateur and related satellite services
P	Radiowave propagation
RA	Radio astronomy
RS	Remote sensing systems
S	Fixed-satellite service
SA	Space applications and meteorology
SF	Frequency sharing and coordination between fixed-satellite and fixed service systems
SM	Spectrum management
SNG	Satellite news gathering
TF	Time signals and frequency standards emissions
V	Vocabulary and related subjects

Note: This ITU-R Recommendation was approved in English under the procedure detailed in Resolution ITU-R 1.

Electronic Publication
Geneva, 2017

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RECOMMENDATION ITU-R P.837-7

Characteristics of precipitation for propagation modelling

(Question ITU-R 201/3)

(1992-1994-1999-2001-2003-2007-2012-2017)

Scope

Rainfall rate statistics with a 1-min integration time are required for the prediction of rain attenuation in terrestrial links (e.g. Recommendation ITU-R P.530) and Earth-space links (e.g. Recommendation ITU-R P.618).

When reliable long-term local rainfall rate data is not available, Annex 1 of this Recommendation provides a rainfall rate prediction method for the prediction of rainfall rate statistics with a 1-min integration time. This prediction method is based on: a) total monthly rainfall data generated from the GPCC Climatology (V 2015) database over land and from the European Centre for Medium-Range Weather Forecast (ECMWF) ERA Interim re-analysis database over water, and b) monthly mean surface temperature data in Recommendation ITU-R P.1510.

When reliable long-term local rainfall rate data is available with integration times greater than 1-min, Annex 2 of this Recommendation provides a method for converting rainfall rate statistics with integration times that exceed 1-min to rainfall rate statistics with a 1-min integration time.

Keywords

Rainfall rate, annual statistics, conversion method, GPCC, ERA Interim

The ITU Radiocommunication Assembly,

considering

- a) that information on the yearly statistics of precipitation parameters are needed for the prediction of attenuation and scattering caused by precipitation;
- b) that the information is needed for all locations on the surface of the Earth and a wide range of probabilities;
- c) that rainfall rate statistics with a 1-min integration time are required for the prediction of rain attenuation and scattering in terrestrial and satellite links;
- d) that long-term measurements of rainfall rate may be available from local sources with a 1-min integration time and, also, with integration times that exceed 1-minute;
- e) that using a model to convert local rainfall rate measurements with integration times up to 1 hour into an integration time of 1-minute may provide higher accuracy than Annex 1 of this Recommendation,

recommends

- 1 that local long-term measurements of annual rainfall rate with a 1-minute integration time should be used if available;
- 2 that local measurements, if used, are collected over a sufficiently long period of time (typically longer than 10 years), to ensure statistical stability;