



**Australian Government**

**Bureau of Meteorology**

## **Gridded Average Lightning Flash Density Metadata**

### *Dataset*

<b>Title</b>	Annual lightning data (base climatological data sets): Annual lightning ground flash density & annual lightning total flash density.
--------------	---

### *Custodian*

<b>Custodian</b>	Bureau of Meteorology
<b>Jurisdiction</b>	Australia

### *Description*

<b>Abstract</b>	Mean annual number of lightning flashes per square km. The grids show the number of lightning flashes per square km per year across Australia in the form of two-dimensional array data. The mean data are based on the eight year period 1995-2012. See LINEAGE below for more information.
<b>Search words</b>	Gridded, analyses, climatology, lightning, meteorology
<b>Geographic Extent Names(s)</b>	Australia
<b>General Category</b>	Gridded data
<b>General Custodian Jurisdiction</b>	Australian Government Australia
<b>Geographic Extent Polygon</b>	Not applicable
<b>Geographic Bounding Box</b>	See below
<b>North Bounding Latitude</b>	-8.25
<b>South Bounding Latitude</b>	-45.25
<b>East Bounding Longitude</b>	159.25
<b>West Bounding Longitude</b>	110.25
<b>Beginning Date</b>	1995
<b>Ending Date</b>	2012

### *Dataset Status*

<b>Progress</b>	Completed
<b>Maintenance and Update frequency</b>	As required

### *Access*

<b>Stored Data Format</b>	Arc/Info grids – all Australia
<b>Available Format Type</b>	ASCII row major.
<b>Access Constraint</b>	<p>Please note that the copyright for any data supplied by the Bureau of Meteorology is held in the Commonwealth of Australia and the purchaser shall give acknowledgement of the source in reference to the data. Apart from dealings under the Copyright Act 1968, the purchaser shall not reproduce (electronically or otherwise), modify or supply (by sale or otherwise) these data without written permission from the supplier. Please contact us (see details below) for more information.</p> <p>Please contact us (see details below) for more information.</p>

### *Metadata constraints*

<b>Use limitation</b>	Use of these data should be acknowledged to the Bureau of Meteorology. Apart from the purposes of study, research, criticism and review, no part of these data may be reproduced, or redistributed for any commercial purposes, or distributed to a third party for such purpose, without written permission from the Director of Meteorology.
<b>Other constraints</b>	These products are made available under the Bureau's default terms of use (noted at <a href="http://www.bom.gov.au/other/copyright.shtml">http://www.bom.gov.au/other/copyright.shtml</a> )
<b>Other constraints</b>	Please refer to <a href="http://www.bom.gov.au/other/disclaimer.shtml">http://www.bom.gov.au/other/disclaimer.shtml</a> for disclaimer details

## Data Quality

<b>Lineage</b>	<p>The lightning total flash density grid and lightning ground flash density grid are based on data from the Optical Transient Detector (OTD) and Lightning Imaging Sensor (LIS) for the Australian region (8.25°S – 45.25°S, 110.25°E – 159.25°E). The analysis is based on 18 years of combined OTD and LIS data. The grid point resolution of the data is 0.5° (approximately 50 km).</p> <p>The ratio, <math>Z</math>, of cloud flashes, <math>N_c</math>, to ground flashes, <math>N_g</math>, was discussed by Kuleshov et al. (2006) in relation to the total lightning flash data obtained from LIS and OTD satellite sensors, with direct estimates of <math>N_g</math> based on ground-based lightning flash counters indicating that although some variation can occur in the specific value of <math>Z</math> (e.g., depending on the specific location and time period), a value of <math>Z = 2</math> provides a useful measure of this ratio throughout Australia.</p> <p>Following Kuleshov et al. [2006], the <math>N_g</math> values were derived from the average annual total flash density values <math>N_t</math>, by using the equation</p> $N_g = N_t / (1 + Z)$ <p>Climatologies of cloud-to-ground lightning flash density (flashes per km) were produced for the Australian region for the warm season (from November to April), cool season (from May to October) and for the entire year. A climatology of total lightning flash density (flashes per km) was also produced for the Australian for the entire year.</p> <p>References: Kuleshov, Y. and Jayaratne, E. R. 2004. Estimates of lightning ground flash density in Australia and its relationship to thunder-days. <i>Aust. Met Mag.</i> 53, 189-196. Kuleshov, Y., Mackerras, D., and Darveniza, M. 2006. Spatial distribution and frequency of lightning activity and lightning flash density maps for Australia. <i>J. Geophys. Res.</i>, Vol. 111, D19105, doi:10.1029/2005JD006982. Dowdy, A. and Kuleshov, Y. 2014. Climatology of lightning activity in Australia: spatial and seasonal variability. <i>Australian Meteorological and Oceanographic Journal</i>, Vol. 64, 103–108.</p>
<b>Positional Accuracy</b>	The OTD and LIS data on which the analysis was based have an associated accuracy of 2.5° (approximately 250 km).
<b>Attribute Accuracy</b>	Not applicable

<b>Logical Consistency</b>	Not applicable
<b>Completeness</b>	No missing data

### *Metadata date*

<b>Metadata date</b>	9 December 2016
----------------------	-----------------

### *Contact Information*

<b>Contact Organisation</b>	Bureau of Meteorology
<b>Contact Position</b>	Climate and Oceans Data and Analysis Section
<b>Mail Address</b>	PO BOX 1289, Melbourne 3001, Australia
<b>State</b>	Victoria
<b>Country</b>	Australia
<b>Postcode</b>	3001
<b>Telephone</b>	(03) 9669 4082
<b>Facsimile</b>	(03) 9669 4515
<b>Electronic Mail</b>	<a href="mailto:climatedata@bom.gov.au">climatedata@bom.gov.au</a>