



Preface to the AAQR Special Issue “Fog, Fog Collection and Dew”

Guest Editors

Otto Klemm, Climatology Working Group, University of Münster, Münster, Germany,

President IFDA (International Fog and Dew Association, fogdew.org)

Werner Eugster, Institute of Agricultural Sciences, ETH Zürich, Zürich, Switzerland

Martha Scholl, Earth System Processes Division, U.S. Geological Survey, Reston, VA, USA

Fábio Luiz T. Gonçalves, Atmospheric Science Department, Institute of Astronomy, Geophysics and Atmospheric Sciences, University of São Paulo, São Paulo, Brazil

Genki Katata, Institute for Global Change Adaptation Science, Ibaraki University, Ibaraki, Japan

Overseeing Editor-in-Chief

Prof. Neng-Huei Lin, National Central University, Taoyuan, Taiwan

Fog is a “suspension of very small, usually microscopic water droplets” that “reduce horizontal visibility at the Earth’s surface to less than 1 km” (WMO, 2017). Fog may also be considered as a cloud in contact with the Earth’s surface. Dew is a “deposit of water drops on objects, produced by the direct condensation of water vapour from the surrounding air” (WMO, 2017). Both fog and dew formation are driven by the condensation of water vapor to liquid water in the very lowest part of the atmospheric boundary layer, i.e., in association with air masses with terrestrial or marine surface contact. Fog as a phenomenon is the object of various science and engineering fields such as meteorology, transportation safety, hydrology, and biology. Fog can scavenge airborne pollutants in urban and industrial areas, creating a health hazard, but can also deliver nutrients to natural environments. As part of the ecohydrology of natural systems around the world, fog creates unique endemic species distributions. Through its unique impact on humans’ perception of the environment, fog has also found its way into literature and the art of painting. In some areas of the world, fog is even utilized as a valuable source for freshwater production. To lesser degree, this is also true for dew, which may be collected with the aim to generate potable water.

The triannual International Conference of Fog, Fog Collection and Dew started some 20 years ago in Vancouver (Canada, 1998), went on through St. John’s (Canada, 2001), Cape Town (South Africa, 2004), La Serena (Chile, 2007), Münster Germany, 2010), Yokohama (Japan, 2013), Wrocław (Poland, 2016), and will be continued in Taipei (Taiwan) in 2019. This special issue of “*Aerosol and Air Quality Research*” (AAQR) is a selection of contributions as presented at the most recent 7th International Conference of Fog, Fog Collection and Dew at the University of Wrocław from 24 through 29 July, 2016. Of the 162 contributions to the conference, 33 were submitted to AAQR as manuscripts to be included in this special issue. Twenty one were accepted after a peer-review process and guest editors’ decisions.

We are thrilled by the liveliness of the world’s community of fog and dew researchers and engineers. Considering the thematic breadth of the community and the breadth of the respective backgrounds, we are pleased to see that fog and dew are common ground and glue at the same time. There is plenty of mutual benefit for conference attendees, as research perspectives, measurements and analysis techniques from one field often inform other fields of study. Topics as covered in this special issue include:

- Studies of the chemical and biological analyses of fog and dew water with various focusses and at various places in the world
Zhu *et al.* Chemical Composition and Bacterial Community in Size-Resolved Cloud Water at the Summit of Mt. Tai, China.
Schurman *et al.* Aqueous Secondary Organic Aerosol Formation in Ambient Cloud Water Photo-Oxidations.
Yadav *et al.* A comparative study on fog and dew water chemistry at New Delhi, India.
Nieberding *et al.* Fog Water Chemical Composition on Ailaoshan Mountain, Yunnan Province, SW China.
Kaseke *et al.* Fog Spatial Distributions over the Central Namib Desert - An Isotope Approach.
- Modelling and forecast of fog
Bari *et al.* Influence of Environmental Conditions on Forecasting of an Advection-Radiation Fog: A Case Study from the Casablanca Region, Morocco.
García-García *et al.* Characterization and Modeling of Fog in the Mexico Basin.
- Observation of fog by using both advanced remote sensing techniques and in-situ approaches
Wang *et al.* A Fog Event off the Coast of the Hangzhou Bay during Meiyu Period in June 2013.

- Tav *et al.* Determination of Fog-Droplet Deposition Velocity from a Simple Weighing Method.
 Cao *et al.* Combined Impact of Tropical Cyclones and Surrounding Circulations on Regional Haze-Fog in Northern China.
 del Río *et al.* ENSO Influence on Coastal Fog-Water Yield in the Atacama Desert, Chile.
 Elias *et al.* Favourable and Unfavourable Scenarios of Radiative Fog Formation Defined by Ground-Based and Satellite Observation Data.
- The interaction of fog with urban atmospheres and air pollution
 Bokwa *et al.* Impact of Natural and Anthropogenic Factors on Fog Frequency and Variability in Kraków, Poland in the Years 1966–2015.
 Bokwa *et al.* Role of Fog in Urban Heat Island Modification in Kraków, Poland.
 Bulbul *et al.* PM₁₀ Sampling and AOD Trends during 2016 Winter Fog Season in the Islamabad Region.
 - Further development of activities and strategies towards collection fog for freshwater production
 Gandhidasan *et al.* Simplified Modeling and Analysis of the Fog Water Harvesting System in the Asir Region of the Kingdom of Saudi Arabia.
 Weiss-Penzias *et al.* A Low Cost System for Detecting Fog Events and Triggering an Active Fog Water Collector.
 Boris *et al.* Fogs and Air Quality on the Southern California Coast.
 Schunk *et al.* Testing Water Yield, Efficiency of Different Meshes and Water Quality with a Novel Fog Collector for High Wind Speeds.
 Lehnert *et al.* A Case Study on Fog/Low Stratus Occurrence at Las Lomas, Atacama Desert (Chile) as a Water Source for Biological Soil Crusts.
 Fernandez *et al.* Fog Water Collection Effectiveness: Mesh Intercomparisons.

Note that only one contribution deals with dew (Yadav *et al.* A comparative study on fog and dew water chemistry at New Delhi, India), which reflects the fact that the dew research community is the smaller one worldwide as compared to the ubiquitous fog research community. Note also that this special issue does not contain any paper on the interaction of fog with vegetation. This may be due to the fact that AAQR is, traditionally, not a forum for vegetation-atmosphere interaction studies.

The fog and dew science community presents some strong research results from five continents and leaves no doubt that this field of research and application is an emerging one. We thank AAQR for hosting this special issue. We look forward to the 8th International Conference of Fog, Fog Collection and Dew from 14 through 19 July 2019 in Taipei.

REFERENCE

WMO World Meteorological Organization (2017). International Cloud Atlas, <https://cloudatlas.wmo.int>.