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Editorial

Early Career Scientists' (ECS) Contributions to *Meteorology*

Edoardo Bucchignani

Meteorology Laboratory, CIRA Italian Aerospace Research Center, 81043 Capua, Italy; e.bucchignani@cira.it

The importance of meteorological events is felt in everyday life and the critical impact of the weather on human activities has led to the development of the science of weather forecasting [1]. The main aim of this Special Issue (SI) was to provide an opportunity to Early Career Scientists in Meteorology to disseminate their valuable results to the scientific community. Potential topics included, but were not limited to, the following: current challenging areas in weather models (including data assimilation techniques); the assessment of a weather model's ability to represent extreme weather events; the assessment of the effects of an increasing spatial resolution in weather models on the quality of the results; small scale processes in the atmosphere; remote sensing in meteorology; and urban weather, including urban heat islands and local nowcasting tools for the operational spaces of drones.

Eleven relevant papers in the proposed fields have been accepted for publication and supported by science-based evidence, which includes studies, experiences, strategies, procedures, and practices at a global level. Moreover, a communication, a perspective, and an opinion were also published. All the papers were prepared by an Early Career Scientist as the first author, and in some cases, the papers were supported by their professors and tutors.

The first paper was written by Est et al. [2], who investigated two late winter cold air outbreaks over the central USA in order to identify their occurrence in association with blocking onset and termination, changes in teleconnection character, and the occurrence of integrated enstrophy maxima in the Northern Hemisphere flow. The study was based on NCEP reanalyses, teleconnection time series, and an archive of blocking events located at the University of Missouri.

The second paper, by Tashie [3], identified trends in the frequency of the days of high-potential evapotranspiration alongside annual water–energy budgets according to a Budyko framework. The author found that episodic water and heat stress (HS) has become less frequent in the humid eastern US and is more common in the arid US and in southeastern Canada. In [4], the authors evaluated the ability of the Numerical Tools for a Hurricane Forecast system at the University of Havana (Cuba) for forecasting the intensity and trajectory of the North Atlantic tropical cyclones, showing a reasonable agreement between the predicted track and the trajectory described by the cyclones. In [5], the authors evaluated how well the temporal trends in geostationary satellite signatures could be used to infer hail in Argentina using verified hail reports from three storm cases that exhibit different storm modes in different large-scale environments. Their results showed that satellite proxies are a promising tool for hail detection in multiple environments for different storm modes. The seasonal precipitation re-forecast for a selected period was evaluated in [6] by using the Brier score in terms of the accuracy and reliability based on tercile probabilities. The re-forecast was produced by the Meteo-France operational seasonal forecasting system. The analyses showed that the spatial distribution of the Brier score depends on tercile thresholds, reference data, sampling methods, and ensemble types. Over the dry regions on land and the Nino regions in the Pacific area, large probabilistic errors can be reduced by adjusting the tercile thresholds.

The ICON model, developed at Deutscher Wetterdienst (DWD) and the Max Planck Institute for Meteorology (MPI-M), was used in [7] to investigate the relevant processes

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responsible for differences of convective precipitation caused by land-surface resolution. The authors found that the position of convective precipitation was influenced by the resolution of the orography, and that coarsening the grid size from 156 to 5000 m considerably changed the location of wind convergence and the associated convection initiation.

The validation of precipitation is one of the most challenging tasks for numerical weather predictions, so in [8], the authors examined the forecast of the ECMWF IFS ensemble model for the territory of Hungary. In particular, they performed an objective verification of single-ensemble-control forecasts and of 51-member ensemble forecasts. In [9], a pattern detection method was applied to the output of seven GCM simulations performed in the frame of CMIP5 under IPCC RCP4.5 and RCP8.5 scenarios to determine whether atmospheric teleconnection patterns detected in the ERA-20C reanalyses will be observable also in future projections. It was found that the majority of teleconnections will remain also in the future, implying that atmospheric internal variability is the major factor that controls the teleconnections rather than the impact of radiative forcing.

In the Mediterranean and Black Sea, low-pressure systems (tropical-like cyclones) similar to mid-latitude and tropical cyclones can form. In particular, a strong system called Falchion was developed in the northern part of the Black Sea in August 2021 and was analyzed in [10] using the NCEP reanalyses and satellite data obtained from the Eumetsat satellite Meteosat-8. In [11], the authors analyzed the meteorological conditions that cause a fast and strong formation of adverse meteorological phenomena (including hail), which forced a commercial airplane into an emergency landing in Buenos Aires (Argentina) in October 2018. Recommendations for meteorologists and aviators in flight safety were also prepared. The last paper [12] deals with the analysis of possible changes in air temperature and precipitation for the late 21st century in Mozambique, according with climate projections provided by the Regional Climate Model RegCM4, under the IPCC RCP4.5 and RCP8.5 scenarios. The results project an increase in the daily maximum and minimum temperature for the last third of the 21st century, along with a general reduction in precipitation.

In addition to the regular articles, this Special Issue includes a communication [13], a perspective [14], and an opinion [15]. In [13], the authors analyzed summertime (June–August) cold-front activity via frequency and duration in the southeastern USA during 1973–2020 to summarize and identify the temporal trends. In [14], the authors proposed three integrative points to cascade disaster displacement linked to anthropogenic climate change. Finally, in [15], an opinion regarding progress, challenges, and opportunities for weather forecasts in Singapore is provided.

In conclusion, the present SI has provided an opportunity to young researchers in *Meteorology* to publish their original research, which was assessed as rigorously as any other paper submitted to *Meteorology*, so that the latest developments and innovative state-of-the-art ideas can be supplied to the scientific community.

Conflicts of Interest: The author declares no conflict of interest.

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