Introduction

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To avoid readers of Pure and Applied Geophysics, *Forensic Meteorology* may seem quite different from past publications. The topical section of *Forensic Meteorology: Observations and Models* serves to highlight collaborations, or partnership we should say, that have existed between forensic science and science of meteorology for centuries yet have been largely unreported until now.

Forensic science, “the application of the methods of the natural and physical sciences to matters of criminal and civil law” (Siegel 2020), encompasses a wide range of disciplines and techniques, from the introduction of fingerprint impressions which remain a reliable tool used in investigations, to more modern methods including the detection of trace evidence through sensitive analytical techniques (Wolstenholme et al. 2021) and the interpretation of low-template (touch) DNA evidence (Alketbi and Goodwin 2019; Simon et al. 2010). Meteorological parameters that play an important role on forensic operations can be listed as temperature, relative humidity, wind and turbulence, rain and snow, radiative fluxes, heat and moisture fluxes, as well as aerosol physical and chemical properties (Gultepe et al. 2019). Specialized forensic disciplines have all relied on weather or climate in some capacity (Amendt et al. 2007; Scala and Wallace 2020). The conditions to which the evidence are subject at a crime scene have an effect on the quality of the sample recovered. For example, scenes exposed to direct sunlight can cause degradation of important

DNA samples (Hall et al. 2014). Forensic investigators examine atmospheric parameters affecting dispersion of air pollutants (Colbeck 2009). While rain and high wind speed prevent flying insects from colonizing human remains, resulting in an inaccurate estimation of time since death if the meteorological conditions are not carefully interpreted (Archer 2004).

This topical section provides an overview of forensic meteorology and reports the work from a range of disciplines where meteorological conditions are pivotal to the interpretation of forensic-related samples. These include the effect of temperature, relative humidity, as well as turbulence and wind on the decomposition of concealed remains and the presence of soil bacteria associated with cases of mass mortality events. Researchers explore novel techniques to help approximate time passed since deposition of blood, which could become crucial when investigating sequence of events at a crime scene. Monitoring of pollution from smelting operations using atmospheric dispersion and forecasting models, as well as exploring morbidities linked to adaptation to the weather and climate conditions provide new dimensions to forensic meteorology. Furthermore, this topical section presents a novel numerical model to predict the internal temperature of a cadaver. Using this predicted temperature, conditions related to the larvae life cycle within a human body can be more accurately predicted.

We hope that this special section will emphasize the important role that science of meteorology plays in forensic casework and research, and fosters the relationships between them.

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