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## Using Eddy Covariance Method in Disciplines beyond Micrometeorology for Scientific, Regulatory, and Commercial Applications

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The Eddy Covariance method is a micrometeorological technique of high-speed measurements of water vapor, gases, heat, and momentum transport within the atmospheric boundary layer. For decades, this technique has been widely used by micrometeorologists, covering over 2100 stationary measurement locations, and numerous airborne and shipborne campaigns. Modern instrumentation and software are rapidly expanding the use of this method in many non-micrometeorological areas of scientific research, and in regulatory and commercial applications. However, a number of researchers from the disciplines outside the micrometeorology and the majority of non-academic investigators are still not familiar enough with the proper implementation of the method required for conducting high-quality, reliable, traceable, and defensible measurements in their respective areas of interest.

Although mostly automated, the method is still mathematically complex, and requires significant care to correctly design the task-specific measurement and data handling system, set up the physical site, and process and analyze the large volumes of data. Efforts of the flux networks (*e.g.*, FluxNet, Ameriflux, Asiaflux, ICOS, NEON, OzFlux, *etc.*) have led to major progress in the unification of the terminology and general standardization of processing steps. The project-specific details of the methodology itself, however, are difficult to unify because various experimental sites and purposes of studies dictate different treatments, and site-, measurement- and purpose-specific approaches.

With this in mind, step-by-step instructions were created to introduce a novice to general principles, requirements, applications, processing and analysis steps of the conventional Eddy Covariance technique, and to assist in further understanding the method through more advanced references such as textbooks on micrometeorology, guidelines from the flux networks, journals, and technical papers. These are provided in the form of the free electronic resource, a 620-page textbook titled "Eddy Covariance Method for Scientific, Regulatory, and Commercial Applications". The explanations are written in a non-technical language to be of practical use to those new to this field.

Information is provided on the theory of the method (including the state of methodology, basic derivations, practical formulations, major assumptions, sources of errors, error treatments, etc.), practical workflow (e.g., experiment design, implementation, data processing, quality control, and analysis), data sharing and flux stations networking, key alternative methods, and the most frequently overlooked details.

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