

# Using Eddy Covariance Method in Disciplines beyond Micrometeorology

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## Abstract

Eddy Covariance method has been actively used by expert micrometeorologists for over 30 years, covering 2155 stationary locations globally, and numerous mobile campaigns over land and water surfaces. Latest measurement technologies and automated processing software are rapidly expanding the use of the method to non-micrometeorological research. Regulatory and commercial uses of the method also increase year-by-year. Despite widening adoption of the method, academic investigators outside the area of 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 data collection and processing are now automated, the method still requires significant care to correctly design the experiment, set up the site, organize and analyze the large amount of data. Efforts of the flux networks (e.g., FluxNet, Ameriflux, Asiaflux, ICOS, NEON, OzFlux, etc.) have led to major progress in the standardization of the method. The project-specific workflow, however, is difficult to unify because various experimental sites and purposes of studies demand different treatments, and site-, measurement- and purpose-specific approaches. To address this situation, 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 in the form of the free electronic resource, a 660-page textbook titled “Eddy Covariance Method for Scientific, Regulatory, and Commercial Applications”. The explanations are provided using easy-to-understand illustrations and real-life examples, and text is written in a non-technical language to be practically useful to those new to this field. Information is provided on 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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### Using Eddy Covariance Method in Disciplines beyond Micrometeorology

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#### Abstract Text:

Eddy Covariance method has been actively used by expert micrometeorologists for over 30 years, covering 2155 stationary locations globally, and numerous mobile campaigns over land and water surfaces. Latest measurement technologies and automated processing software are rapidly expanding the use of the method to non-micrometeorological research. Regulatory and commercial uses of the method also increase year-by-year.

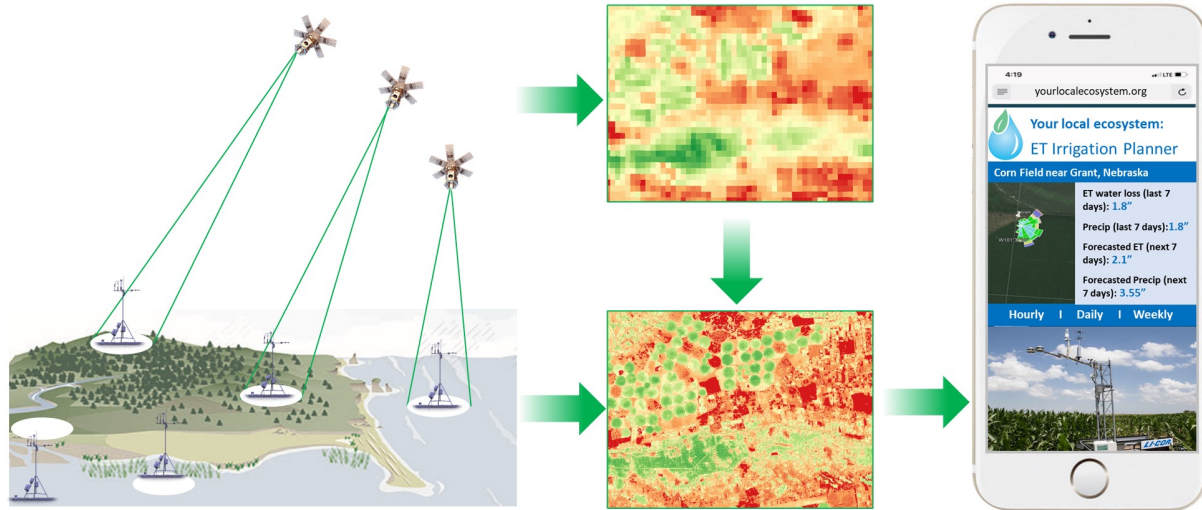
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**Session Selection:**

B010. Advances in understanding Water-Energy-Carbon interactions

**Submitter's E-mail Address:**

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**Abstract Title:**

Using Eddy Covariance Method in Disciplines beyond Micrometeorology

**Requested Presentation Type:**

Assigned by Program Committee (oral, eLightning or poster discussion session)

**Previously Published?:**

Yes

**Previously Published Material:**

Parts of this presentation were shown at virtual EGU-2021 meeting, before the new Eddy Covariance textbook was finalized. However, since then, the textbook was largely finalized and a substantial amount of new information was added to the presentation.

**AGU On-Demand:**

Yes

**Abstract Payment:**

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