Current and Future Issues in BioMicrometeorological Measurements and Eddy Covariance & Publishing Strategies

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The scale of physiological ecology (Osmond)
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Biomicrometeorology automatically integrates to field-regional scales
Common Current Systems:

Eddy Covariance Above,
Crude Mean Profile Within Canopy for
Carbon and Water Storage
Eddy Covariance

TURBULENT FLUX

MEAN FLUX

TURBULENT FLUX

ATMOSPHERE

H2O

Vert. Wind

SOIL

MASS BALANCE TO MEASURE CARBON, WATER EXCHANGE
Common Current Systems:

Eddy Covariance Above,
Crude Mean Profile Within Canopy for Carbon and Water Storage

COSTS (US DOLLARS)
2,000-20,000 SONIC ANEMOMETER
10,000-15,000 IRGA FOR CO$_2$
2,000-17,000 FOR PROFILER

INACCURACY
10-20% UNDER TURBULENT CONDITIONS
20-100% UNDER LOW TURBULENCE
Overstory (70 m) Eddy-Covariance System

Eddy Covariance Above

LOW TURBULENCE: (Normally at Night)
Carbon Emission Never Reaches Canopy Top
Carbon Advects Below

Estimate by Temperature, Moisture. Etc.
Equation Derived when Turbulence High (as measured by $u^*$)

Estimate by Chambers over Soil, Plant Elements

Estimate by Direct Advection Measurements
FUTURE DEVELOPMENTS

Smaller, More Sensitive Sonic Anemometers
More Accurate Understory/Soil Exchange
Less Expensive, Improved Mean Advection
Turbulent Advection Measurements Possible

Less Expensive Fast Response IRGAs or other Gas Sensors
Improved Mean Advection
Turbulent Advection Measurements Possible

Networking of Sensors Possible to Make Both Eddy-Covariance and Advection Measurements Possible
FUTURE DEVELOPMENTS

Process-Based Models Become more Sophisticated
Improvements in Parameter Measurements Improve Process-Based Results Models Used for Data Filling

Empirical Models Become more Sophisticated and are used for Data Filling
PUBLISHING GUIDELINES

PUBLISH NEW/NOVEL MATERIAL--NEW
CONCEPTUAL FRAMEWORKS
THEORY
EXPERIMENTAL TECHNIQUES
NEW SITES WITH NEW RESULTS
(DIFFERENT CONTINENT, CLIMATE, SOIL, ECOSYSTEM TYPE)
NEW RESULTS (DIFFERENT ECOSYSTEM RESPONSE)

LEVEL OF NOVELTY IMPORTANT
PUBLISHING GUIDELINES

OUTLINE-ORGANIZATION OF PAPER
ABSTRACT
INTRODUCTION & LITERATURE REVIEW
MATERIALS AND METHODS
RESULTS & DISCUSSION
CONCLUSIONS
ACKNOWLEDGEMENTS
REFERENCES/BIBLIOGRAPHY
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OUTLINE-ORGANIZATION OF PAPER
Outline the paper by including the major methods
OUTLINE-ORGANIZATION OF PAPER

ABSTRACT-- Briefly Explain main points of the manuscript, and how they are important to the topic/subject
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ABSTRACT

INTRODUCTION & LITERATURE REVIEW

In a few pages, summarize what has been done field that is relevant to your manuscript--please don’t make this section too long--and highlight what is NEW about your study
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ABSTRACT

INTRODUCTION & LITERATURE REVIEW

MATERIALS AND METHODS

Describe the experiment well enough for someone else to replicate the experiment; describe the field site sufficiently well (location, canopy height, fetch, altitude above sea level, species, leaf area index, history of ecosystem, etc.)

2-5 Pages
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MATERIALS AND METHODS
Describe the experiment well enough
For someone else to replicate the experiment; Describe
  Sensor TYPES
  LOCATION of sensors,
  DATA used (Dates, Times),
  CALIBRATION procedures for sensors (Dates, Frequencies)
Data QUALITY CONTROL/ASSURANCE
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MATERIALS AND METHODS
RESULTS & DISCUSSION
DESCRIBE THE RESULTS, AND IF THE RESULTS MATCH PREVIOUS STUDIES 5-15 PAGES
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MATERIALS AND METHODS
RESULTS & DISCUSSION
CONCLUSIONS (One Paragraph or Two)
POINT OUT THE MOST RELEVANT FINDINGS BASED ON THE REST OF THE PAPER, CONCLUDING REMARKS ESTABLISHING IMPORTANCE OF PAPER, NOVELTY OF RESULTS
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CONCLUSIONS
ACKNOWLEDGEMENTS
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IMPORTANT MODIFICATION OF CONCEPT
LATEST MODIFICATION OF CONCEPT
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DON’T CITE REFERENCES FOR VERY COMMON TECHNIQUES SUCH AS EDDY-COVARIANCE, SOIL CHAMBERS, ETC. OR IF YOU DO, CITE EARLIEST REFERENCES
EXAMPLE: (SWINBANK 1951)
PUBLISHING GUIDELINES

IF YOU ARE NOT A NATIVE ENGLISH/AMERICAN WRITER:

GIVE TO A FLUENT ENGLISH/AMERICAN SPEAKER-WRITER TO GO OVER PAPER, PAGE, PARAGRAPH AND SENTENCE STRUCTURE
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