



Calhoun: The NPS Institutional Archive
DSpace Repository

Faculty and Researchers

Faculty and Researchers' Publications

2020-01-14

Challenges for Mesoscale Numerical Models in the Littoral Environment

Flagg, David D.; Doyle, James D.; Haus, Brian K.; Graber, Hans C.; MacMahan, Jamie H.; Ortiz-Suslow, David G.; Shen, Lian; Wang, Qing; Williams, Neil J.; Beach, Reginald...

AMS

Flagg, David D., et al. "Challenges for Mesoscale Numerical Models in the Littoral Environment." 100th American Meteorological Society Annual Meeting. AMS, 2020.
<http://hdl.handle.net/10945/66919>

This publication is a work of the U.S. Government as defined in Title 17, United States Code, Section 101. Copyright protection is not available for this work in the United States.

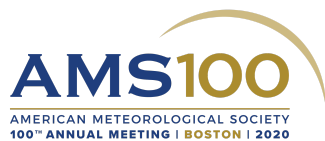
Downloaded from NPS Archive: Calhoun



Calhoun is the Naval Postgraduate School's public access digital repository for research materials and institutional publications created by the NPS community. Calhoun is named for Professor of Mathematics Guy K. Calhoun, NPS's first appointed -- and published -- scholarly author.

Dudley Knox Library / Naval Postgraduate School
411 Dyer Road / 1 University Circle
Monterey, California USA 93943

<http://www.nps.edu/library>



6.4: Challenges for Mesoscale Numerical Models in the Littoral Environment

Tuesday, January 14, 2020

02:15 PM - 02:30 PM

📍 Boston Convention and Exhibition Center - 158

High-resolution numerical weather prediction (NWP) in the littoral zone remains an outstanding challenge due to the complexity of the surface physical and thermodynamic properties, coastline representation and turbulence quantification. Prevailing approaches to surface flux parameterization in mesoscale NWP are susceptible to error in the littoral zone in part due to the surface heterogeneity and the impact of wind direction on the surface fluxes. The Coastal Land-Air-Sea Interaction (CLASI) project conducted a pilot field campaign during two weeks in summer 2016 around Monterey Bay, California, USA, to collect in-situ and remote measurements of meteorological and oceanographic quantities on-shore, off-shore and slightly inland to capture the cross-shore and along-shore gradient of key atmospheric fields and turbulent fluxes in a variety of conditions. The region was modeled using mesoscale NWP with the Coupled Ocean/Atmosphere Mesoscale Prediction System (COAMPS®) at horizontal resolutions as fine as 333 m. Whereas COAMPS performed well with predictions of near surface scalar and momentum fields verified by surface mesonet stations 4 to 5 km in-land, the pilot project revealed several sources of error in mesoscale NWP along the coastline. Such errors include a strong positive model bias of surface momentum flux and a lack of sensitivity of surface momentum flux to wind direction, a result expected since surface flux parameterizations are designed for homogeneous conditions.

This presentation will show results of new high-resolution NWP model studies performed in preparation for an impending more extensive CLASI field campaign planned for summer 2020 in Monterey Bay. The goal of this latest modeling work is to identify the optimal locations and other constraints for observations needed as part of the larger field campaign objective to develop and validate new NWP model surface flux parameterizations. The COAMPS runs will be compared against large-eddy simulation of Monterey Bay littoral environments to validate NWP surface flux parameterizations in the littoral zone and better understand NWP model sensitivity. The presentation will also outline planned CLASI field campaign efforts for 2020.

Authors

David D. Flagg

NRL
Monterey, CA, USA

James D. Doyle

NRL
Monterey, CA, USA

Brian K. Haus

Univ. of Miami
Miami, FL, USA

Hans C. Graber

Univ. of Miami
Miami, FL, USA

Jamie H. MacMahan

NPS
Monterey, CA, USA

David G. Ortiz-Suslow

NPS
Monterey, CA, USA

Lian Shen

Univ. of Minnesota
Minneapolis, MN, USA

Qing Wang

NPS
Monterey, CA, USA

Neil J. Williams

Univ. of Miami
Miami, FL, USA

Reginald Beach

ONR
Arlington, VA, USA



 **Recorded Presentation**
Recording.

[Find Similar](#)

View Related Events

Day: Tuesday, January 14, 2020