University of Victoria | Graduate Studies

Notice of the Final Oral Examination
for the Degree of Master of Science

of

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BSc (South China Agricultural University, 2015)

"Is Ocean Reflectance Acquired by Ferry Passengers Robust for Science Applications?"

Department of Mathematics and Statistics

Tuesday, December 12, 2017
10:00 A.M.
Clearihue Building
Room B007

Supervisory Committee:
Dr. Laura Cowen, Department of Mathematics and Statistics, University of Victoria (Supervisor)
Dr. Maycira Costa, Department of Geography, UVic (Outside Member)

External Examiner:
Dr. Yvonne Coady, Department of Computer Science, UVic

Chair of Oral Examination:
Dr. Dale Ganley, School of Business, UVic

Dr. David Capson, Dean, Faculty of Graduate Studies

Abstract

Monitoring the dynamics of the productivity of ocean water and how it affects fisheries is essential for management. It requires data on proper spatial/temporal scales, which can be provided by operational ocean colour satellites. However, accurate productivity data from ocean colour imagery is only possible with proper validation of, for instance, the atmospheric correction applied to the images. In situ water reflectance data is of great value due to the requirements for validation and it is traditionally measured with the Surface Acquisition System (SAS) solar tracker system. Recently, an application, `HydroColor', was developed for mobile devices to acquire water reflectance data. We examine the accuracy of the water reflectance acquired by HydroColor with the help of trained and untrained citizens under different environmental conditions. We used water reflectance data acquired by SAS solar tracker and HydroColor onboard the BC ferry Queen of Oak Bay from July to September 2016. Monte Carlo permutation F-tests were used to assess whether the differences between measurements collected by SAS solar tracker and HydroColor with citizens were significant. Results showed that citizen HydroColor measurements were accurate in red, green, and blue bands, as well as red/green and red/blue ratios under different environmental conditions. Piecewise models were developed for correcting HydroColor blue/green water reflectance ratios based on the SAS solar tracker measurements. In addition, we found that a trained citizen obtained higher quality HydroColor data under clear skies at noon.