

OW_20

漢寶潮澗帶風剖面光達觀測與 WRF 模擬

Lidar observation and WRF simulation of Wind Profiles for HanBao Intertidal Zone

周庭光¹、蔡原祥²、苗君易¹、楊雅兆²、陳柏中^{1*}

¹ 國立成功大學航空太空工程學系

² 國立實驗研究院台灣海洋科技中心

Ting-Kuang Chou¹, Yuan-Shiang Tsai², Jiun-Jih Miao¹, Yao-Chao Yang², Bo-Chung Chen^{1*}

¹ Department of Aeronautics and Astronautics, National Cheng Kung University

² Taiwan Ocean Research Institute, National Applied Research Laboratories

ytsai@narlabs.org.tw; p46044419@mail.ncku.edu.tw

摘要

本研究於台灣西海岸彰化漢寶潮澗帶進行季節性風場特性觀測。使用光達風剖儀量測 12 層高度進地表大氣分層。高頻率風速與溫度擾動則由超音波風速計量測。根據日夜大氣穩定度研究風速、風向、紊流強度與雷諾應力垂直剖面分布。此外，並使用經驗指數與理論對數風速剖面進行比對。亦使用 WRF 模擬該地區風場並與同時段光達量測進行分析比較。

關鍵詞：光達風剖儀、大氣邊界層、風場、WRF 模擬。

Abstract

Field observations of wind characteristics were conducted during the periods dominated by the seasonal monsoon at HanBao intertidal zone located in the middle of western coastal of Taiwan where the offshore wind farm will be constructed. The wind LiDAR was employed to observe the wind speed and direction at 12 range gates for a study of the atmospheric boundary layer (ABL) near the surface. High frequency observation of the wind speed and temperature were measured using an ultrasonic anemometer near the ground. Vertical profiles of the wind speed, direction, turbulence intensity, and Reynolds stress were studied based on the stability stratification in day and night. In addition, the empirical power law and theoretical log law were used to fit the wind profile. WRF model simulated the regional wind pattern and made a comparison with the LiDAR observations.

Keywords: LiDAR, atmospheric boundary layer, WRF simulation.