

潮位站水位資料之基準偏移偵測與改正分析

An Analysis of Datum Shift Detection and Correction in Tide Gauge Data

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摘要

隨著全球暖化日益加劇，海平面上升已成為全球關注的重大氣候變遷議題。為有效因應海洋環境變遷與極端氣候所帶來的風險，準確掌握海水位變化資訊對於環境監測與災害預警具關鍵性影響。潮位站所提供的長期觀測紀錄，為分析潮汐與海水位變化的重要依據，然其紀錄可能受限於基準偏移（斷點）等因素，導致資料產生系統性誤差，進而影響應用準確性。本研究以中央氣象署設置潮位站之歷史水位資料為基礎，發展一套系統化的基準偏移（斷點）偵測與修正技術處理流程。研究中將應用調和分析法、最佳分段法、Jumps Upon Spectrum and Trend (JUST) 等多種偵測技術，針對不同模擬偏移情境進行測試與比較，建立可行且穩健的基準偏移（斷點）偵測流程，最後結合調和分析與步階函數對模擬資料進行基準偏移（斷點）修正，並對修正後之成果進行量化評估。

關鍵字：潮位站紀錄、基準偏移偵測、基準偏移改正、調和分析法、最佳分段法、JUST

Abstract

As global warming intensifies, sea level rise has become a critical issue in climate change. To effectively address risks posed by marine environmental changes and extreme climate events, accurately understanding sea level variations is essential for environmental monitoring and early warning systems. Long-term tide gauge records provide essential data for analyzing ocean tides and sea level variations; however, these records may be affected by factors such as datum shifts, resulting in systematic errors that subsequently affect their practical applications. This study develops a systematic procedure for detecting and correcting datum shifts, based on historical tide gauge records managed by the Central Weather Administration of Taiwan. Multiple detection techniques, including harmonic analysis, optimal partitioning, and Jumps Upon Spectrum and Trend (JUST), are applied to test and compare various simulated datum shift scenarios, aiming to establish a feasible and robust detection procedure. Finally, we employ harmonic analysis combined with step functions to correct the simulated datum shifts, and quantitatively evaluate the effectiveness of these corrections.

Key words : Tide gauge records, Datum shift detection, Datum shift correction, Harmonic analysis, Optimal partitioning method, JUST