An Evaluation Study for Improving Gap Flow Simulations in Coastal Areas on Portugal

INTRODUCTION

Winds inferred by Synthetic Aperture Radar (SAR) satellites are a very important source of spatial wind field behavior along coastal areas particularly on small coastal areas that are temporary affected by strong flow disturbances mainly driven from land to the ocean. Gap flow circulations, among others, are an example of such wind phenomena disturbances which are not yet described by regional atmospheric models nor by CFD modeling. Such situations could compromise both offshore wind resource and park deployment studies on places affected by the presence of these phenomena types. A possible way to overcome this situation is the usage of SAR images assimilated into regional atmospheric models using certain type of assimilation techniques. In this work, a real case occurred in a coastal area in Portugal will be taken into account. A strong gap flow occurred during the beginning of the night 9 December 2010 was captured by a SAR image which was assimilated into the model. Some validation meteorological stations were used for validation purposes taken into account scenarios performed with and without wind SAR assimilation. Spatial results lead to the conclusion that the assimilation of SAR images improves the wind pattern results which reflects how SAR assimilation into the mesoscale models are important for simulating the coastal wind flow patterns.