Mithu Debnath, J Appl Mech Eng 2013, 2:3
http://dx.doi.org/10.4172/2168-9873.S1.003

OMICS Group Conferences
Accelerating Scientific Discovery

International Conference and Exhibition on
Mechanical & Aerospace Engineering
September 30-October 02, 2013 Hilton San Antonio Airport, TX, USA

Effect of stratification on the blade-tip vortices of wind turbine blade

Mithu Debnath
University of Texas, USA

The large eddy simulation (LES) has been demonstrated as a valid research tool to resolve the wind turbine (WT) wake. To date, we still do not have a good understanding of the wake-wake interactions between the WT. In the present work LES is used to simulate flow over tall, multi-MW wind turbine in a stratified atmospheric thermal boundary layer (ABL) to understand the wake dynamics. One of the dominant characteristics of the wake region is the blade-tip vortices. We do not understand the effect of atmospheric stratification on these blade-tip vortices. The focus is to understand the effect of stratification on the blade-tip vortex shedded from the turbine blade. LES have been performed for two inline WT placed 5D (D is the diameter of the WT) apart in stable, unstable and neutral ABL at conditions to understand the time evolution of the tip vortices that are shed from the WT. The results have revealed the generation of helical, spiral vortex, however the nature of evolution of these vortices is different under different stratification conditions.

In the present talk, the spatial and time evolution of the spiral vortices and the rate of growth/decay will be discussed, thus demonstrating the effect of stratification on the tip-vortices.

Biography

Mithu Debnath is a master's student of University of Texas at San Antonio, UTSA. He did his BS in Mechanical Engineering from BUET. His recent work in wind turbine is under review in Journal of Wind Energy.

mithu05_buet@yahoo.com