















that are near to the hills will have strong effect that can cause change in direction and wind speed of wind (Liu, 1991).

Liu, 1991 also reported that wind speed will increase quickly at the top of the hills and it is caused due to streamlines. The gradient of wind gets closer to the surface as the height of hills increase, resulting in a reduction of the gradient height of hills. This phenomenon will cause an increase in the speed within the boundary layer. The strong wind may encounter the structures that exist at the leeward of the hills if the direction changes. Stathopoulos, 2007 stated that the turbulence (mechanical) is higher in rougher terrain than in smoother terrain but it will decrease with increasing height above ground.

#### **4. CONCLUSION**

Wind speeds and wind directions were obtained at four stations in northern state of Malaysia. This paper discusses on how to estimate the wind speed at certain location and certain height. The estimation of maximum wind speed at unknown location can be determined by using surface interpolation from GIS technique. This method produced wind speed map at northern region of Malaysia. Power law is another possible method to estimate the wind speed at that location at the tip of arrestor (145.6 m) after GIS technique found the wind speed at 10 m by plotting the vertical wind speed profile. From GIS technique, there two methods has been applied which are IDW and TIN method that gave almost the same result which is 16.46 m/s and 16.43 m/s. From these two results, the vertical wind profile has been plotted and gave the value of 29.85 m/s and 29.79 m/s and can be categorized as violent storm.

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