1077-35-712 **Ranis N Ibragimov*** (Ranis.Ibragimov@utb.edu), Brownsville, TX 78520. *Lie group analysis - a microscope of physical and engineering sciences.*

The aim of this presentation is, from the one hand, to impart to the wide audience of researchers and students with the comprehensive and easy to follow introduction to Lie's group analysis and, from the other hand, is to present several recent results in this area whose discussion discloses the advantages to be gained from the use of the group theoretic approach. The emphasis will be on an application of Lie group analysis to nonlinear Navier-Stokes equations modelling the large-scale atmospheric motion around the rotating Earth. The inquiry is motivated by dynamically significant Coriolis forces in meteorology and oceanographic applications. This project is aimed to contribute to a better observational knowledge of the spatial and temporal distribution of mixing in the atmosphere and the ocean than achieved to date. The exact solutions are obtained in terms of elementary functions and visualized. One of the impacts of the project is, from one hand, to learn more about the influences of large scale fluid flows on the environment, highlighted by fundamental issues such as global warming and long term climate change and, from the other hands, is to illustrate the advantages of mathematical modeling of e.g., oil spill associated with the Deepwater Horizon incident. (Received September 11, 2011)