Airborne GPS radio occultation (RO) data was collected onboard an atmospheric research aircraft during the 2010 NSF “PRE-Depression Investigation of Cloud-systems in the Tropics” (PREDICT) field campaign. A GPS receiving system developed at Purdue University, the GNSS Instrument System for Multi-static and Occultation Sensing, (GISMOS) was installed on the Gulfstream-V (GV) aircraft for this campaign. The PREDICT campaign focused on the collection of atmospheric data from tropical weather disturbances in the Atlantic which had the potential to develop into tropical cyclones. The primary scientific purpose of PREDICT was to collect data to test the hypothesis that tropical cyclones develop in a region of high moisture and convection within a protected area of vorticity (Dunkerton et al., 2009). The central idea of this theory is that when the zonal flow moves at the same speed as an African easterly tropical wave, the air is isolated the outside environment and forms a closed circulation in the co-moving reference frame. Therefore, persistent convection within this region will result in progressive moistening of the air that is insulated from the intrusion of dry air and wind shear which could otherwise inhibit development. Hurricane Karl (September 2010) was a system extensively studied during PREDICT. Six missions were flown into this system during the development and genesis of this tropical cyclone. Airborne GPS RO data was collected during these and other flights with the objective of retrieving high-resolution vertical moisture profiles in the vicinity of the aircraft. The RO data is used in conjunction with airborne dropsonde data to study the moisture environment of Karl and Gaston through forward simulations and by comparison to the observed GPS excess phase. An overview of the data set collected during the campaign is presented along with perspectives for the future, including the goal of assimilating the data into high resolution weather models of the pre-cyclone environment.