

GLOBAL GRAVITY AND TOPOGRAPHY

W.L. Sjogren, Jet Propulsion Laboratory, Pasadena, California 91109

We will describe the above topics and pole orientation, rotation and a geodetic control network. The gravity reductions produced two products for geophysical modeling. They are line-of-sight acceleration profiles and spherical harmonic coefficients. The acceleration profiles were generated from the raw Doppler residuals on a single orbit of MageHan (MGN) radio tracking data. There are over 2,500 profiles from excellent X-Band Doppler tracking (1- σ noise cO. 1 mm/sec for a 10 sec average) producing over three million individual observations. There are three sets of spherical harmonic models: a 40th degree and order using data from MGN cycle 4 + part of cycle 5, a 60th degree and order using data from MGN and Pioneer Venus Orbiter (PVO), and a preliminary 75th degree and order using almost all MGN and PVO data. A final 75th degree and order model will be available in early 1995 which will incorporate all PVO and MGN data. These results were produced by M. Batchelder, E. Graat, J. Giorgini, A.S. Konopliv and W.L. Sjogren at JPL and are all archived at the planetary data node at Washington University, St. Louis, Missouri.

The topography data acquired by the radar altimeter on MGN were reduced and archived as three different products. They are the Altimetry Radiometry Composite Data Record (ARCDR), the Global Data Record (GxDR), and a 360th degree and order spherical harmonic model. The ARCDR is an orbit-by-orbit data set that contains all the derived parameters (radius, rms slope, reflectivity and emissivity as a function of latitude and longitude). It contains some four million observations covering MGN cycles 1, 2 and 3. There was also some high resolution altimetry obtained with the SAR antenna. The GxDR are image maps of topography (GTDR), reflectivity (GREDR), rms slope (GSDR) and emissivity (GEDR). There were gaps in the MGN altimetry but these gaps were filled with Pioneer Venus Orbiter and Venera data before a 360th degree and order spherical harmonic model was extracted for complete global topography. These results were compiled by Peter G. Ford and Gordon Pettengill at MIT and the harmonics were estimated by Nicole Rappaport at JPL. All are archived at the planetary data node in St. Louis, Missouri.

The Venus spin pole orientation, rotation rate and geodetic control network were obtained by processing the SAR imaging data independently and also by incorporating Doppler radio tracking and radar altimetry. Some effort was made to incorporate Venera 15 and 16 SAR imaging but there is some inconsistency, primarily the identification of precise locations on the Venera images. These results were produced by M.E. Davis, T.R. Colvin, P.G. Rogers at Rand Corporation, P.W. Chodas at JPL and E.L. Akim at Keldysh Institute, Moscow, Russia.