The files stored with this Readme file contain the results from the study "Possible Deep Structure and Composition of Venus with Respect to the Current Knowledge from Geodetic Data" by Xiao et al. (2020).

A total of 2400 models with radial parameters used in this study are stored in the Archives "COLD_Model_TEST01 (v0=1e14)", "COLD_Model_TEST03 (v0=1e12)", "COLD_Model_TEST03 (v0=1e13)", "HOT_Model_TEST01 (v0=1e14)", "HOT_Model_TEST03 (v0=1e12)", and "HOT_Model_TEST03 (v0=1e13)" separately. File name field "_cold" and "_hot" indicate the model cases; field "_oc" indicates the models with out a solid inner core (SIC); field "_ic" indicates the models with an SIC; field "_M&A" indicate the mantle composition models. "v0=1e14" in brackets indicate the choice of v_0.

For example, the file "Model_cold_ic_16_M&A (v0=1e14).csv" means it contains the No.16 "Cold" model with an SIC, v_0=10^{14} Pa·s, and based on the mantle composition model M&A. In each .csv file, rad is the radius (m), rho is the density (kg/m^3), P is the pressure (Pa), T is the temperature (K), Vp is the P-wave velocity (m/s), Vp is the S-wave velocity (m/s), visco is the viscosity (Pa·s), and g is the gravitational acceleration (m/s^2).

Venus_mantle_M&A.dat is the build file. This build files are used in calculating the mantle entropy, density, seismic velocity, thermal expansion, and heat capacity. Based on the method mentioned in Appendix A, we used the build file that exclude pPv to obtaine the P-T path of each models. Venus_lowermantle_M&A.dat, is the build file which include the pPv, to check the phase transition along the P-T path. It only includes part of lower mantle and the TBL (80~140 GPa and 2000~5000 K). Venus_mantle_V1.dat, Venus_mantle_V2.dat, and Venus_mantle_V3.dat are the build files used in studying the influence of different mantle composition (Table S1) on TBL.

Data used to plot Figures 3-5 from Xiao et al. (2020) are stored as "Data_COLD_TEST01 (v0=1e14).csv" and "Data_HOT_TEST01 (v0=1e14).csv". The file contains the results of 400 models. Model No.1-300 indicates the model without an SIC (icb=NaN). Rcmb is the core

radius (m), Tcmb is the temperature at the CMB (K), S_content is the weight fraction of S (wt %), Si_content is the weight fraction of Si (wt %), Ricb is the inner core radius (m), hTBLb is the thickness of the TBL_b (m), hTL is the thickness of the TL (m), k2 is the synthetic tidal Love number k_2 with α= 0.25, k2_pos is the uncertainty of k_2 caused by α=0.2, k2_neg is the uncertainty of k_2 caused by α=0.3, Q is the synthetic tidal dissipation factor Q with α=0.25, the Q_pos is the uncertainty of Q caused by α=0.3, the Q_neg is the uncertainty of Q caused by α=0.2, and MoI is the mean moment of inertia.

Data used to plot Figure 6 from Xiao et al. (2020) are stored as "Data_COLD_TEST02.csv" and "Data_HOT_TEST02.csv". Each file contains the results of 18 models. v0 is the parameter v_0 (Pa·s), Tcmb is the temperature at the CMB (K). k2, k2_pos, k2_neg, Q, Q_pos, Q_neg and MoI are the same as above.

Results based on $v_0=10^{12}$ and 10^{13} Pa·s are summarized in "Data_COLD_TEST03 (v0=1e12).csv" , "Data_COLD_TEST03 (v0=1e13).csv", "Data_HOT_TEST03 (v0=1e12).csv", and "Data_HOT_TEST03 (v0=1e13).csv" respectively. The data format is the same as "Data_COLD_TEST01 (v0=1e14).csv".

The base map of Figure 8 is stored as TBL_M&A.ps, and the build_TBL_M&A.dat is the build file used in Perple_X to plot this base map. The base map of Figures S2-S4 are TBL_V1.ps, TBL_V2.ps, and TBL_V3.ps; the build_TBL_V1.dat build_TBL_V2.dat, and build_TBL_V3.dat are the build files used in Perple_X to plot these base maps.

Figures S1-S4 are the figures in Supporting Information.