In this work, we describe the possibilities of the ATLANTIDA3.1_2014 software, which was recently developed for analyzing the data on tides of the Earth. These possibilities include the calculation of the gravimetric oceanic effect, the amplitude delta-factors for oceanless Earth, as well as the predicted amplitude factors and phase shifts for the Earth with ocean. Calculation of the amplitudes and phases of the oceanic gravimetric effect with the allowance for dissipation based on six oceanic tidal models (SCW80, CSR3, CSR4, FES95.2, FES2012 v NA099b). The delta-factors of the diurnal and semidiurnal body tides and their latitudinal dependences are calculated according to [Spiridonov E.A., 2014]. For the other groups of waves, the program uses the average values of delta-factors of the body tides from [Dahlin V., et al., 1999]. The program also calculates the tidal series. These computations are carried out by the PROLET subroutine developed by E.A. Boyarsky and L.V. Alansayeva. The computational scheme here largely follows the PREDICT program from the Wenzel’s ETERNA 3.3 package. The expansion of tidal potential into 1200 Tamura’s waves (1987) is applied.

PROGRAM FEATURES

General:
• Calculation of the amplitudes and phases of the oceanic gravimetric effect with the allowance for dissipation based on six oceanic tidal models (SCW80, CSR3, CSR4, FES95.2, FES2012 v NA099b).
• Calculation of the amplitude delta-factors for oceanless Earth and calculation of the prognostic amplitude factors and phase shifts for the Earth with the ocean. The delta-factors of the diurnal and semidiurnal body tides and their latitudinal dependences are calculated according to [Spiridonov E.A., 2014]. For the other groups of waves, the program uses the average values of delta-factors of the body tides from [Dahlin V., et al., 1999].
• Calculation of the tidal time series. These computations are carried out by the PROLET program developed by E.A. Boyarsky and L.V. Alansayeva. The computational scheme here largely follows the PREDICT program from the Wenzel’s ETERNA 3.3 package. The expansion of tidal potential into 1200 Tamura’s waves (1987) is applied. The correction for the conversion from UTC to TDT time is taken from the USNO website http://maia.usno.navy.mil/ser7/deletelt.data and decimated in such a way that for the time after 1973, the error of the correction does not exceed 1 s (the error of the tidal effect is less than 1 mm/c2).

Optional:
• Calculation of the amplitudes and phases of the oceanic gravimetric effect at the grid nodes;
• Calculation of the horizontal components of the oceanic effect.

The calculations can be carried out with two models of the Earth (PREM and IASP91).

The interface has a button that runs the LOAD07 program. This program is completely identical to the LOAD97 program of the Wenzel’s ETERNA3.3 package. At the same time, LOAD07 has a convenient user-friendly interface, which makes it possible to conduct calculations both at a single point and on a grid and to select the waves of interest for the user. This interface was designed by Ernst Boyarsky in 2011. Later, two updates were introduced into the program. They provided the possibility to account for the effect of the M2 wave of FES95.2 model, which was previously impossible, and fixed the bugs associated with introducing the station height corrections and mass correction in the FES95 and SCW80 models. The LOAD07 program has its own HELP (only available in Russian in this version of the program).

MAIN COMPUTATIONAL PROCEDURES

The general flow-chart of the calculations that are carried out while preparing the initial data for the ATLANTIDA3.1_2014 program and the calculations that are carried out directly by our program are illustrated by Fig. 1.