It is presented preliminary results of operational ionosphere dynamics prediction system for the Brazilian Space Program, based on the Sheffield University Plasmasphere-Ionosphere Model (SUPIM). During the system operation, several ionospheric simulation runs are performed at different geographic longitudes. A parallel version for the code (P-SUPIM) was then developed for enhancing the performance. After preliminary tests, it was frequently observed code instability, when negative ion temperatures or concentrations were obtained. It was verified that most of these problems occurred due to concentration estimation of simulation points located at high altitudes, typically over 4000 Km. To achieve convergence, an artificial exponential decay for ion-neutral collisions was used above mentioned altitudes. This approach shown no significant difference from original code output, but improved substantially the code stability, since the ion diffusion is inversely proportional to the collisions. Then at high altitudes the density of the atmosphere is very low, therefore the collisions of some atoms or molecules reaches values very close to zero. In order to make the system even more stable, the initial altitude and initial ion concentration values used on artificial exponential decay equation are changed within pre-defined values. Also, it was verified that independent runs of P-SUPIM, using independent initial altitude and initial ion concentration variations reduced significantly the number of system failures. The system final output, composed by the vertical total electron content (VTEC) map prediction for South America is generated every day, with almost 24 hours ahead.