Nuclear structure properties with an updated Gogny force

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The increasing need for nuclear data far from the valley of stability requires information on nuclei which cannot be accessed experimentally or for which almost no experimental data is known. Consequently, the use of microscopic approaches to predict properties of such poorly known nuclei is necessary as a first step to improve the quality of nuclear data evaluations. Within this context, large scale mean field calculations from proton to neutron drip-lines have been performed using the Hartree-Fock-Bogoliubov method based on the D1S Gogny nucleon-nucleon effective interaction. Nearly 7000 nuclei have been studied under the axial symmetry hypothesis and several properties are now available for the nuclear scientific community on an Internet web site for every individual nucleus. However, this extensive study has evidenced severe deficiencies of the D1S interaction among which a poor description of the nuclear masses. The present work consists in showing how an updated interaction can solve the D1S deficiencies in mass predictions while keeping its good properties. In particular, it is shown that the Gogny force is also well suited for an accurate determination of nuclear masses. The first mass table based on a Gogny-Hartree-Fock-Bogolyubov calculation including an explicit and coherent account of all the quadrupole correlation energies will be presented.