Spectroscopy is at the root of modern planetary science, enabling us to determine the physical properties of planets remotely. As a result, standardized spectroscopic databases, were initiated in the early 1970s, such as GEISA (Gestion et Etude des Informations Spectroscopiques Atmosphériques; Management and Study of Atmospheric Spectroscopic Information), at LMD, in France.

The 2015 release of GEISA [Jacquinet et al., 2016 and references herein], will be presented including significant updates and additions implemented in the three independent sub-databases of GEISA-2015: the “line parameters database” contains 52 molecular species (113 isotopologues) (spectral range from 10³ to 35,877.031 cm⁻¹). A new molecule (SO₃) has been added. HD₂O, isotopologue of H₂O, is now identified as an independent molecular species. The “cross section sub-database” has been updated and enriched by the addition of 43 new molecular species in its infrared part. A new section is added, in the near-infrared spectral region, involving 12 molecular species: CH₄, CN, CH₃CN, CH₃CH₂O, H₂O, HO₂, H₂O₂, HNO₃, NH₃, the “micropysical and optical properties of atmospheric aerosols sub-database” has been significantly enriched. It contains more than 40 species originating from NCAR and 20 from the AERIS archive of Oxford University. Since the time of its creation GEISA has entered a new phase with the advent of high precision spectroscopy, coupling important developments in spectroscopic databases and radiative transfer modeling, to meet the needs of the international space agencies for the exploitation of these remote sensing data. Consequently, GEISA is constantly evolving, taking into account the best available spectroscopic data which are validated using the original and powerful approach of the SPARITE chain [Armante et al., 2016] developed at LMD.

The need to improve and consolidate the spectroscopic parameters is becoming a priority in order to exploit the increased spectral resolution and radiometric accuracy of new atmospheric instruments. In this context, spectroscopic parameters of targeted molecular species will be updated in GEISA-2018, associated with space missions such as: -IASI-NG, H₂O, HDO, HD₂O, CO₂, N₂O, CO, CH₄, CH₃CN, CH₃CH₂O, H₂O, HO₂, H₂O₂, HNO₃, NH₃, the “micropysical and optical properties of atmospheric aerosols sub-database” has been significantly enriched. It contains more than 40 species originating from NCAR and 20 from the AERIS archive of Oxford University. Since the time of its creation GEISA has entered a new phase with the advent of high precision spectroscopy, coupling important developments in spectroscopic databases and radiative transfer modeling, to meet the needs of the international space agencies for the exploitation of these remote sensing data. Consequently, GEISA is constantly evolving, taking into account the best available spectroscopic data which are validated using the original and powerful approach of the SPARITE chain [Armante et al., 2016] developed at LMD.

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GEISA and associated management software facilities are implemented and freely accessible on the AERIS/ESPRI atmospheric chemistry data center website. It is used on-line by more than 300 laboratories working in various domains like atmospheric physics, planetology, astronomy, astrophysics. GEISA line parameter database is the reference for current or planned TIR/SWIR space missions and it is associated with the work in progress in the frame of the ISSWG scientific group for IASI and its future IASI-NG.