Development of Exoplanet database “ExoKyoto” aiming for inter-comparison with different criteria of Habitable zones

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An integrated database of confirmed exoplanets, capable in comparing several different definition of Habitable Zone, is developed and launched as “ExoKyoto”, for the purpose of better comprehension of those existing celestial entities in different star system. The ExoKyoto core-module is written in C++ with definition of different classes as “ExoPlanet” and “HostStar” objects. The classification of Habitable zone for each host star is based on Kopparapu et al. (2013) as the reference cases, at the same time this database determine Solar Equivalent Astronomical Unit (SEAU) to promote easy comprehension of different star system equivalent to that of Solar System.
The database has inter-comparison module with existing exoplanet database as Exoplanet.eu, Open Exoplanet Catalogue, and NASA exoplanet archive, and updating module in order to secure commonly agreed value for each planet. Since most of exoplanets found by Kepler spacetelescope detected only by transit method does not confirmed their mass by radial velocity, a mass estimation module for most of Super-Earth sized planets is included developed based on the Larsen and Geoffrey (2014). Using this mass-assumption module, the portion of Super-Earth sized exoplanets (2-10 Mearth) become dominant (794 among 1988) compared with that of super jovian sized ones (>500 Mearth) (480 among 1988), being comparable to total jovian & super jovian planets (926), in which only 140 of those Super-Earth sized mass has confirmed by radial velocity. Throughout the comparison between habitable criteria by Kopparapu et al. (2013) and ours (SEAU), most of exoplanets orbiting around M type stars have different conditions each other. The potential impact of stellar flares on those exoplanets can be discussed using our database.
For outreach purpose, ExoKyoto possesses interface with GoogleSky for easy comprehension of those celestial bodies among stellar map.
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Kopparapu R. K. et al. 2013. Habitable Zones Around Main-Sequence Stars: New Estimates. *The Astrophysical Journal*, 765:131

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