[구SS-09] Phase dependent disk averaged spectra and light curve of the Earth as an habitable exoplanet ; Ray-tracing based simulation using 3D optical earth system model

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Previously we introduced ray-tracing based 3D optical earth system model for specular and scattering properties of all components of the system (i.e. clear-sky atmosphere, land surfaces and an ocean surface). In this study, we enhanced 3-dimensional atmospheric structure with vertical atmospheric profiles for multiple layer and cloud layers using Lambertian and Mie theory. Then the phase dependent disk averaged spectra are calculated. The main results, simulated phase dependent disk averaged spectra and light curves, are compared with the 7 bands(300～1000nm) light curves data of the Earth obtained from High Resolution Instrument(HRI) in Deep Impact spacecraft during Earth flyby in 2008. We note that the results are comparable with the observation.

[구SS-10] DETECTION OF WIDE PLANETARY SYSTEM WITH MICROLENSING

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Recent results from microlensing surveys show that a free-floating planet or a wide-separation planet is more numerous than a main-sequence star in the Galaxy. Moreover, the detection efficiency of the planets will be improved in next-generation experiments with a high survey monitoring frequency. However, microlensing events produced by both planets appear similar light curves with a short duration timescale, thus it is difficult to distinguish them. In this paper, we investigated the detectable separation range of a wide-separation planet as the planet bound to its host star. We construct the fractional deviation maps using the magnifications of the planetary lensing and the single-lensing by planet itself for various parameters such as a mass ratio, separation, and source radius. As a result, we found that the pattern of the fractional deviation is related to the ratio of source radius to caustic size, and the ratio satisfying the detection criterion (i.e., ≥5% in the fractional deviation) varies with a separation. Hence, we derived a fitting formula as the function of a mass ratio and a source radius to reflect the variation in the calculations of the detectable separation range of a wide-separation planet as the planet bound to its host star. In addition, we estimated the condition that a wide-separation planet can be detected as a single-lensing event under the finite source effect. We found that such a case is possible provided that the source radius is smaller than ~2.5 times of Einstein ring radius of a planet, regardless of a separation or a mass ratio.