A Look at Galactic Dust Emission via the *Akari* All-Sky Surveys and the *Planck* Anomalous Microwave Emission Map

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The anomalous microwave emission (AME) continues mystify those studying dust at both the infrared wavelengths, and on into the microwave domain. What physical mechanism/s produce this strongly dust-correlated foreground to pervade in the microwave domain? While we are not able to answer this question yet, we do provide evidence against one of the popular hypotheses: electric dipole emission from spinning polycyclic aromatic hydrocarbon molecules (PAHs). The AKARI space telescope, during its lifetime up until the cryogen depletion, contributed a wealth of data across the whole sky. This includes near to mid-infrared spectroscopy, an all-sky point-source catalog, and most important for this study – seven all-sky imaging surveys. The Far Infrared Surveyor maps provided (with their release in 2014) maps covering the typical thermal peak of dust emission (at 65, 90, 140, and 160 μm), though with higher angular resolution and a longer wavelength reach than IRAS. More critical for this study, are the Infrared Camera (IRC) all-sky maps, centered at 9 and 18 μm, which have just undergone a pre-release, and are in the community data-verification phase. The 9 μm band offers unique wavelength coverage, including several major unidentified infrared band (UIR) features, otherwise called "the PAH features". We have undertaken a comparison of the AKARI 9 μm data, as well as the other 6 AKARI all-sky maps, with the AME map released as part of the Planck Collaboration Public Release 2 data set. IRAS data, and Planck/High Frequency Instrument data, are incorporated as well for comparison and for constraining the Rayleigh-Jeans tail of the dust SED. Via 1-degree-scale aperture photometry, we demonstrate that, for 98 galactic AME hot-spot coordinates highlighted by the Planck Collaboration, there is no preferential correlation between the AME and the AKARI 9 μm band (or the IRAS 12 μm band). We do however find a peculiar pattern among all of the mid infrared bands sampled, wherein the relationship between the AME and the MIR has a slightly different trend for regions towards the Galactic center than for longitudes towards the outer galaxy. As a side-product of the investigation, we provide a look at the AKARI/IRC data quality relative to the IRAS all-sky maps.