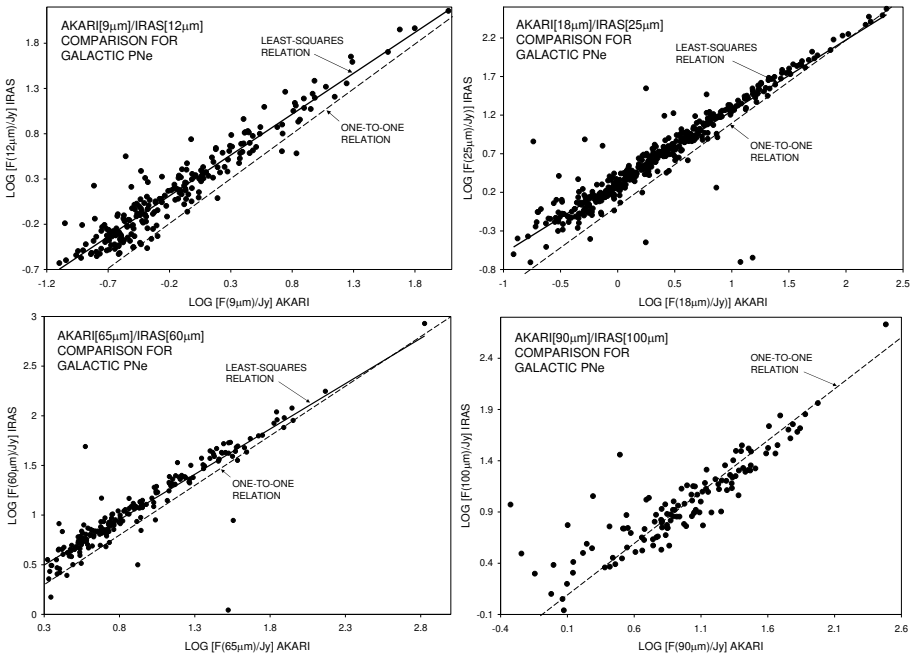

Fig. 3. Comparison of IRAS and AKARI photometric results, whence it is seen that there is a linear relation in all of the panels. However, there is also evidence for a systematic disparity between the trends. This may be partially attributable to differences in the wavelengths of observation, and the spectral gradients of the nebular SEDs.

these trends are subsequently corrected using logarithmic expressions.

We therefore believe that most of the difference can be attributed to the differing mean wavelengths of observation. Thus, where grain temperatures are of the order 110 K, and the grain emissivity function varies as $\epsilon \propto \lambda^{-\gamma}$, $\gamma \cong 1$, then one obtains flux differences similar to those noted in the 18 μm/24 μm panel. A somewhat higher temperature ($\sim$190 K) is required for the 12 μm/9 μm results; a value which is rather larger than is normally attributed to PNe dust continua. It is possible that these latter results are dominated by warmer components of emission, however, such as has been described in the analyses of 2MASS results (e.g., Phillips & Ramos-Larios 2005, 2006, 2007). It is also worth noting that emission at these shorter wavelengths occurs at the Wien limits of the dust continua, where flux levels tend to be lower. As a consequence, emission from lines and bands has a greater impact upon the results (see § 3.1 for a fuller description of these components), and may contribute to the discrepancies noted above.

Although this interpretation of the trends is plausible, and undoubtedly accounts for much of the disparity in the results, we note that flux differences are larger for fainter sources, and almost disappear where sources are brighter. One likely explanation for this trend arises from the fact that sources having larger apparent fluxes also have lower intrinsic radii. We determine that $F_\nu(18\ \mu\mathrm{m}) = 0.20(D/\mathrm{pc})^{-1.17}$, with a correlation coefficient $r \cong 0.51$. Given that sources with smaller diameters also tend to have higher grain temperatures (§ 3.2), this would imply that nebulae having higher fluxes $F_\nu(18\ \mu\mathrm{m})$ also have higher temperature continua. This, where it is the case, would lead to a narrowing of the flux differences.

3. EVOLUTIONARY TRENDS IN THE AKARI PHOTOMETRY

Previous analyses of *IRAS* photometry have suggested that the properties of nebular dust evolve with time. It has been suggested for instance that grain temperatures and dust/gas mass ratios both decrease as nebular radii increase. Similarly, it has been proposed that the masses and sizes of the grains decrease with radius (Pottasch et al. 1984; Lenzuni et al. 1989), although such an evolution has been discounted in the study of Stasinska & Szczerba (1999).

Such broad evolutionary trends are also apparent in the present AKARI spectral energy distributions (SEDs), examples of which are illustrated in Figure 4. In this case, the sources are ordered according to the channel of peak flux, and all of the fluxes have an FQUAL parameter of 3. Sources peaking