Analysis of AGN selected through variability in the mid-infrared in the GOODS fields

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Abstract

We have carried out a study of the sources presenting mid-infrared (MIR) variability analyzing the data taken in the deepest Spitzer/MIPS 24 μm surveys in the GOODS-S and GOODS-N fields. Here we present the results for GOODS-S. Our main goal is to select (possibly obscured) Active Galactic Nuclei (AGN) based on dust emission variability and to analyze their properties. For this purpose, we have used the Spitzer Heritage Archive (SHA) and downloaded all available data taken by the MIPS instrument in the GOODS-S region. These data come from different surveys: GOODS, FIDEL, and the Guaranteed Time Observer (GTO) observations. We have divided the dataset in 7 different epochs, with typical time lapses between them of several months. We have constructed stacked mosaics for the data taken in the different epochs, dividing them by depth. Then, we have built source catalogs using PSF fitting methods. By comparing the measured fluxes in different epochs, also taking into account the photometric uncertainties, and visually inspecting all candidates to avoid artifacts, we have constructed a sample of bona fide variable sources (with at least 5σ confidence). In GOODS-S, the sample of MIR variable sources is composed of 10 objects. A preliminary analysis of their properties points out to a heterogeneous nature. The candidates include low redshift emission-line galaxies and high-z red and disturbed systems, probably experiencing wet major mergers with significant obscured star formation and/or AGN activity.