New empirical metallicity calibrations: Joint analysis of CALIFA data and literature T_e-based measurements

R. A. Marino[1], F. F. Rosales-Ortega[2], S. F. Sánchez[3], A. Gil de Paz[1] and the CALIFA team

[1]CEI Campus Moncloa, UCM-UPM, Departamento de Astrofísica y CC. de la Atmósfera, Facultad de CC. Físicas, Universidad Complutense de Madrid, Avda. Complutense s/n, 28040 Madrid, Spain. email: ramarino@ucm.es

[2]Instituto Nacional de Astrofísica, Óptica y Electrónica, Puebla, México.

[3]Instituto de Astronomía, Universidad Nacional Autonóma de México, D. F.

Abstract. In Marino *et al.* (2013) we provide revisited empirical calibrations for the oxygen abundances in HII regions based on the O3N2 and N2 indicators. This work is based on the most comprehensive compilation of both T_e-based and multiple strong-line (ONS-based) ionized-gas abundance measurements in external galaxies to date in terms of all statistical significance, quality, and coverage of the parameters space. Our dataset compiles the T_e-based abundances of 603 HII regions extracted from the literature but also includes new measurements from the CALIFA survey. We also present a comparison between our revisited calibrations with a total of 3423 additional CALIFA HII complexes with abundances derived using the ONS calibration. The O3N2 and N2 indicators can be empirically applied to derive oxygen abundances calibrations from either direct-abundance determinations with random errors of 0.18 and 0.16, respectively, and they show shallower abundance dependencies and statistically significant offsets compared to the classical calibrations (as the one of Pettini & Pagel (2004)).

Keywords. galaxies: abundances - galaxies: evolution - ISM: abundances - (ISM): HII regions - techniques: spectroscopic
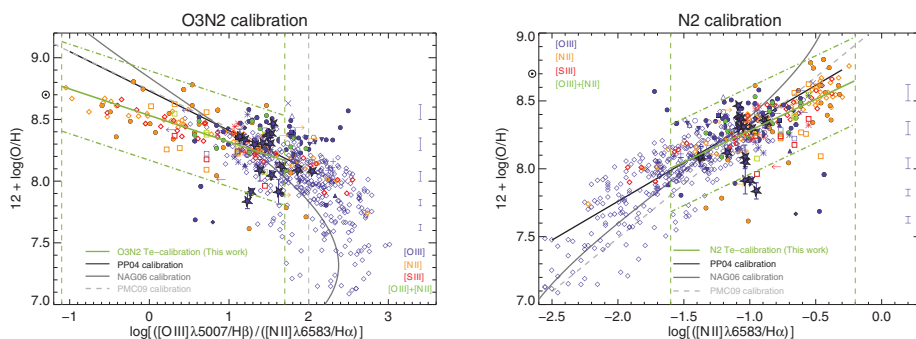
Figure 1. Oxygen abundance versus the O3N2 and N2 indices for T_e-based HII regions (see more details in Marino *et al.* (2013)).

References

Marino, R. A., Rosales-Ortega, F. F., Sánchez, S. F., *et al.* 2013, *A&A*, 559, A114
Pettini, M. & Pagel, B. E. J. 2004, *MNRAS*, 348, L59