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Correction to: Determining star-formation rates in active galactic nuclei hosts via stellar population synthesis

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Key words: errata, addenda – galaxies: active – galaxies: evolution – galaxies: ISM – galaxies: star formation – galaxies: stellar content.

This is a correction to the paper entitled 'Determining star-formation rates in active galactic nuclei hosts via stellar population synthesis' that was published in March 2021 in Monthly Notices of the Royal Astronomical Society, Volume 501, Issue 3, pp. 4064-4079, 10.1093/mnras/staa3907. In a reanalysis of the MEGACUBES we found an inconsistency on the H_0 value we have adopted. While for the $\mathrm{SFR}_\star$ we used $H_0 = 73.0\,\mathrm{km\,s^{-1}\,Mpc^{-1}}$, for the SFR_{Gas} we have used $H_0 = 67.7\,\mathrm{km\,s^{-1}\,Mpc^{-1}}$. Now we have adopted a uniform value of $H_0 = 73.0\,\mathrm{km\,s^{-1}\,Mpc^{-1}}$ for both $\mathrm{SFR}_\star$ and SFR_{Gas} (as well as for $\Sigma\mathrm{SFR}_\star$ and $\Sigma\mathrm{SFR}_\mathrm{Gas}$). This has implied a small but systematic effect in our correlations, therefore we have updated figs 1 (pg 4068), 2 (pg 4069), 3 (pg 4070), and 4 (pg 4072) from the original manuscript by those presented below (Figs 1, 2, 3, and 4). The transformation equation has also been updated. The conclusions of the paper are unaffected by this inconsistency and remain unchanged.

Thus:

(1) in the **Abstract** the sentence: 'We find that the $\Sigma\mathrm{SFR}_\star$ over the last 20 Myrs closely reproduces the $\Sigma\mathrm{SFR}_\mathrm{Gas}$, although a better match is obtained via the transformation: $\log(\Sigma\mathrm{SFR}_\star) = (0.872 \pm 0.004)\log(\Sigma\mathrm{SFR}_\mathrm{Gas}) - (0.075 \pm 0.006)$ (or $\log(\Sigma\mathrm{SFR}_\mathrm{Gas}) = (1.147 \pm 0.005)\log(\Sigma\mathrm{SFR}_\star) + (0.086 \pm 0.080)$), which is valid for both AGN hosts and non-active galaxies.'

should be read as:

We find that the $\Sigma\mathrm{SFR}_\star$ over the last 20 Myrs closely reproduces the $\Sigma\mathrm{SFR}_\mathrm{Gas}$, although a better match is obtained via the transformation: $\log(\Sigma\mathrm{SFR}_\star) = (0.870 \pm 0.004)\log(\Sigma\mathrm{SFR}_\mathrm{Gas}) + (0.007 \pm 0.006)$ (or $\log(\Sigma\mathrm{SFR}_\mathrm{Gas}) = (1.149 \pm 0.005)\log(\Sigma\mathrm{SFR}_\star) - (0.008 \pm 0.008)$), which is valid for both AGN hosts and non-active galaxies.

(2) the sentence on page 4071: 'Besides obtaining the linear regressions to the data, as described above, we derived the Spearman's correlation coefficients, which are also listed within the figs 1 and 3 panels. These figures show that: (i) when considering only SF spaxels from the control sample we found $\log(\Sigma\mathrm{SFR}_\star) = (0.792 \pm 0.006)\log(\Sigma\mathrm{SFR}_\mathrm{Gas}) - (0.224 \pm 0.010)$ with $r = 0.62$; (ii) when using the SF spaxels from the AGN hosts we found $\log(\Sigma\mathrm{SFR}_\star) = (0.957 \pm 0.006)\log(\Sigma\mathrm{SFR}_\mathrm{Gas}) + (0.080 \pm 0.009)$ with $r = 0.80$; and (iii) finally when combining both samples we find $\log(\Sigma\mathrm{SFR}_\star) = (0.872 \pm 0.004)\log(\Sigma\mathrm{SFR}_\mathrm{Gas}) - (0.075 \pm 0.006)$ with $r = 0.70$. The three best-fit lines in Fig. 3 show a very similar slope, and a nearly one to one correlation is found.'

should be read as:

Besides obtaining the linear regressions to the data, as described above, we derived the Spearman's correlation coefficients, which are also listed within the figs 1 and 3 panels. These figures show that: (i) when considering only SF spaxels from the control sample we found $\log(\Sigma\mathrm{SFR}_\star) = (0.790 \pm 0.006)\log(\Sigma\mathrm{SFR}_\mathrm{Gas}) - (0.142 \pm 0.010)$ with $r = 0.62$; (ii) when using the SF spaxels from the AGN hosts we found $\log(\Sigma\mathrm{SFR}_\star) = (0.951 \pm 0.006)\log(\Sigma\mathrm{SFR}_\mathrm{Gas}) + (0.157 \pm 0.009)$ with $r = 0.80$; and (iii) finally when combining both samples we find $\log(\Sigma\mathrm{SFR}_\star) = (0.870 \pm 0.004)\log(\Sigma\mathrm{SFR}_\mathrm{Gas}) + (0.007 \pm 0.006)$ with $r = 0.70$. The three best-fit lines in Fig. 3 show a very similar slope, and a nearly one to one correlation is found.

(3) the original equation (10) and its text on page 4071: 'The results presented here clearly show that we can use the transformation equation:

$$\log(\Sigma\mathrm{SFR}_\star) = (0.872 \pm 0.004)\log(\Sigma\mathrm{SFR}_\mathrm{Gas}) - (0.075 \pm 0.006) \quad (10)$$

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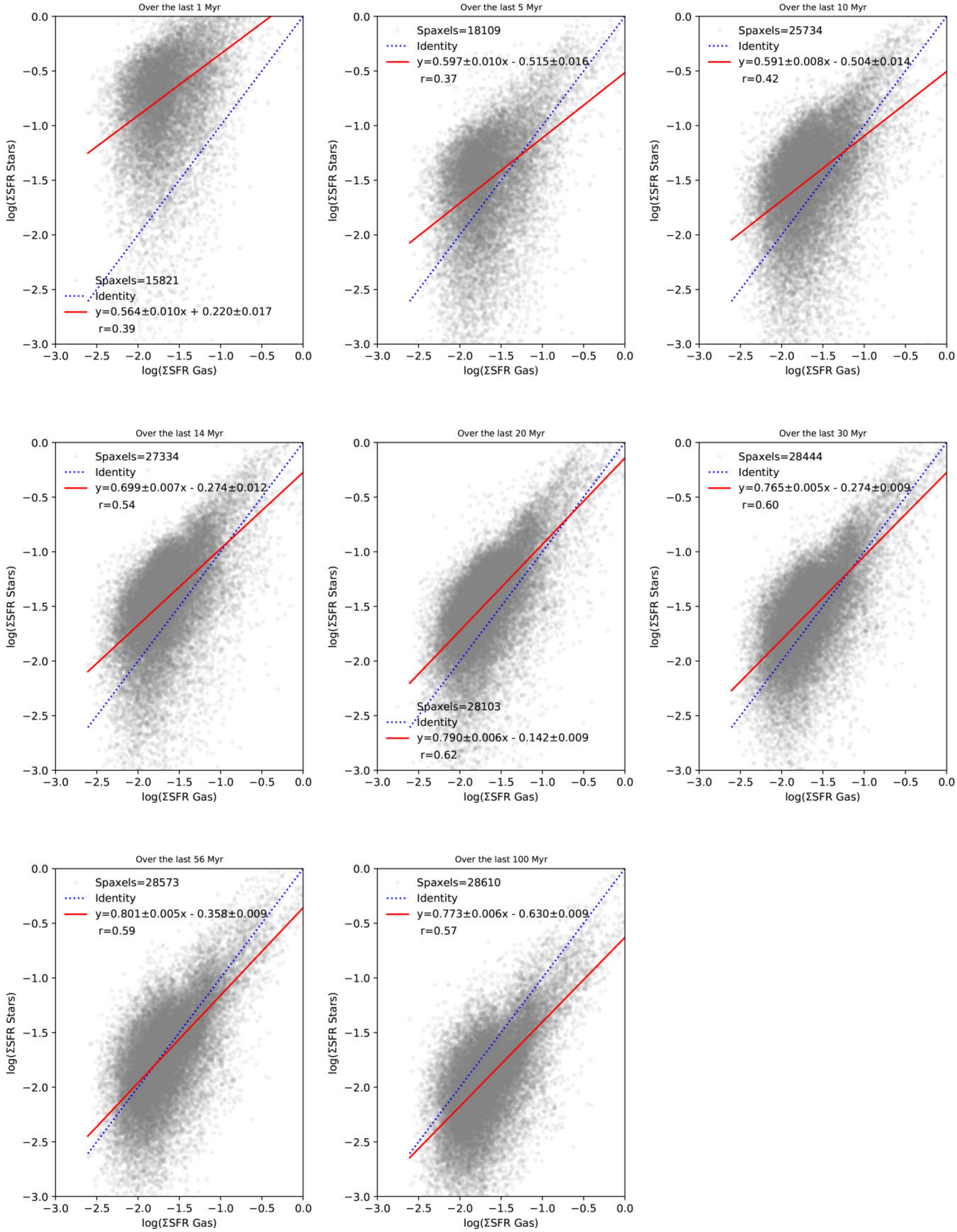

Figure 1. Comparison of ΣSFR_{Gas} with $\Sigma SFR_{\star}$ in logarithm units of $M_{\odot}\,yr^{-1}\,kpc^{-2}$ over the last 1, 5, 10, 14, 20, 30, 56, and 100 Myr, for all spaxels of the AGN and control samples obeying the criteria of section 3.1. The red line is the linear relation of a robust fit between $\log(\Sigma SFR_{Gas})$ and $\log(\Sigma SFR_{\star})$ given inside the panels. We also list the number of spaxels and the Spearman's correlation coefficient (r) of the relation. For more details see text.

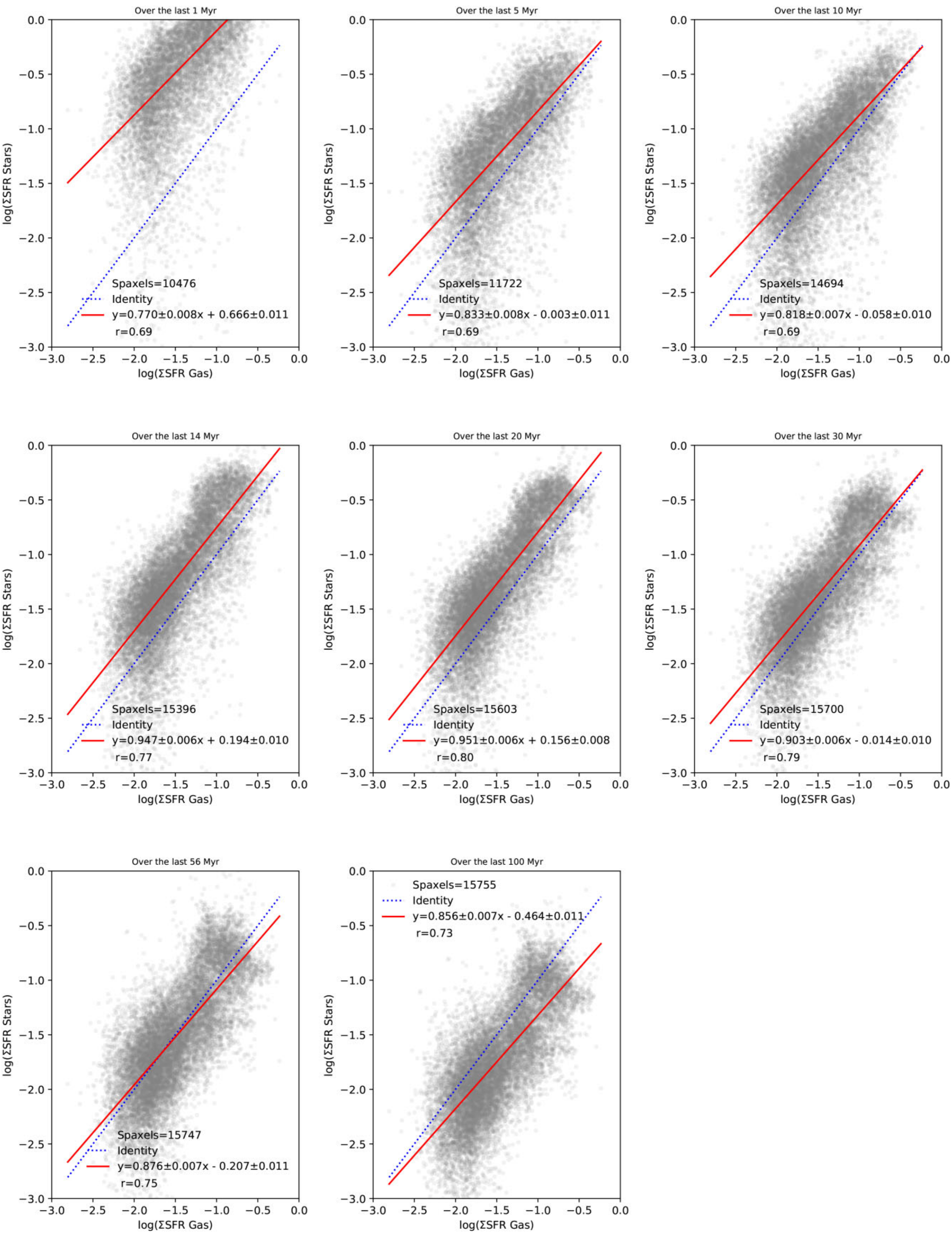

Figure 2. Same as Fig. 1 but only for the star-forming spaxels in the AGN sample.

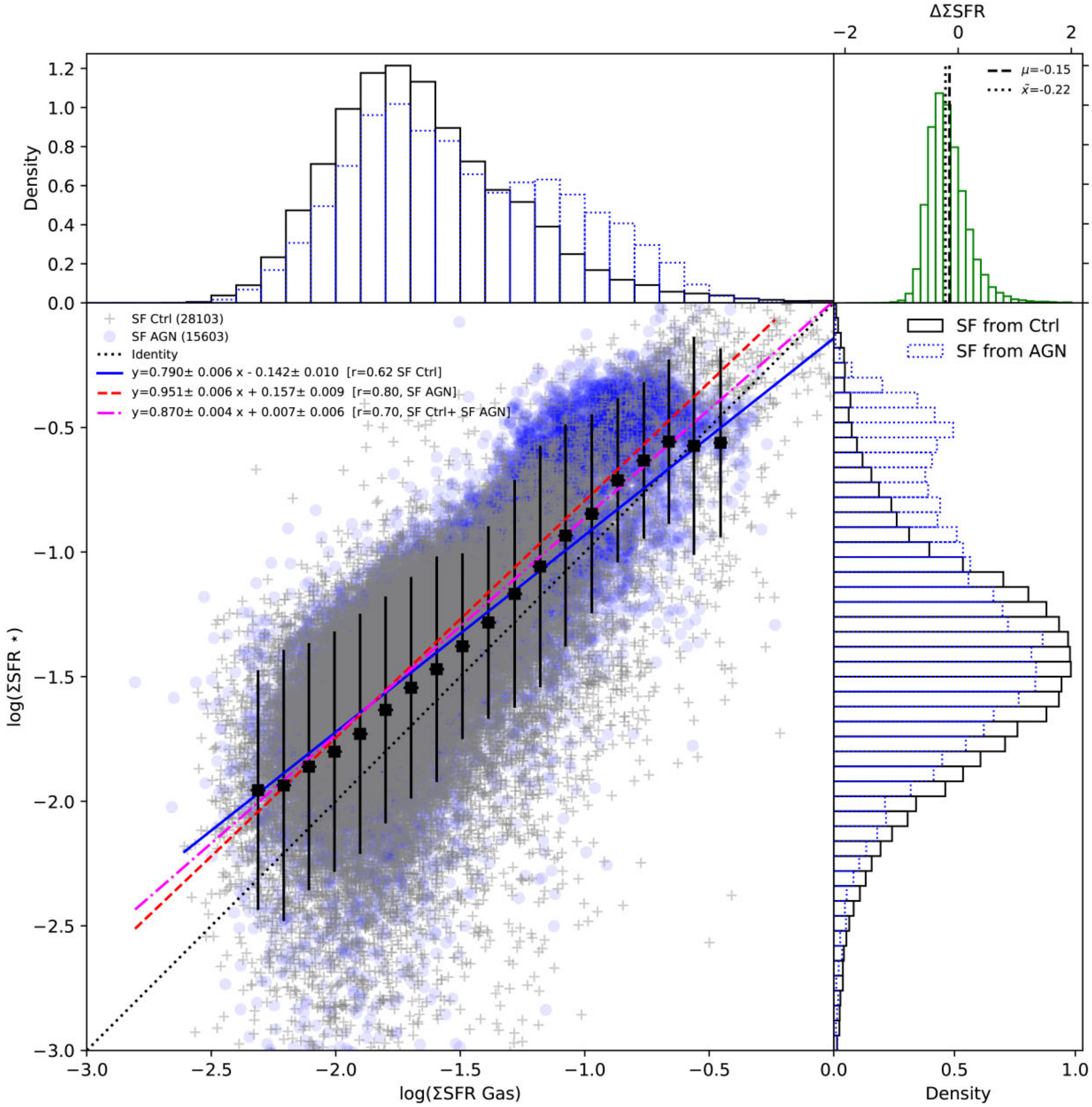

Figure 3. $\Sigma\mathrm{SFR}_\star$ *versus* $\Sigma\mathrm{SFR}_{\mathrm{Gas}}$ over the last 20 Myr in log scale. Spaxels with SF line ratios taken from the control sample ('Ctrl') are represented as grey plus symbols, SF spaxels taken from AGN hosts as light blue circles. Regressions for each data set are labelled. Squares represent the mean value with standard deviations of 20 linearly spaced bins over $\log(\Sigma\mathrm{SFR}_{\mathrm{Gas}})$ (values below 0.5 and 99.5 of the q-th percentile were removed) considering all spaxels (SF Ctrl and SF AGN). Density histograms for $\Sigma\mathrm{SFR}_{\mathrm{Gas}}$ and $\Sigma\mathrm{SFR}_\star$ of both samples are also shown. The top right histogram shows the $\Delta\Sigma = \log(\Sigma\mathrm{SFR}_{\mathrm{Gas}}) - \log(\Sigma\mathrm{SFR}_\star)$ as well as the mean (μ) and median ($\tilde{x}$) values of this difference.

or

$$\log(\Sigma\mathrm{SFR}_{\mathrm{Gas}}) = (1.147 \pm 0.005)\log(\Sigma\mathrm{SFR}_\star) + (0.086 \pm 0.080)$$

to obtain the gas ΣSFR from the stellar one.'

should be read as:

The results presented here clearly show that we can use the transformation equation:

$$\log(\Sigma\mathrm{SFR}_\star) = (0.870 \pm 0.004)\log(\Sigma\mathrm{SFR}_{\mathrm{Gas}}) + (0.007 \pm 0.006) \quad (10)$$

or

$$\log(\Sigma\mathrm{SFR}_{\mathrm{Gas}}) = (1.149 \pm 0.005)\log(\Sigma\mathrm{SFR}_\star) - (0.008 \pm 0.008)$$

to obtain the gas ΣSFR from the stellar one.

(4) the first item of the conclusions (page 4073):

(i) 'The $\Sigma\mathrm{SFR}_\star$ over the last 20 Myrs and $\Sigma\mathrm{SFR}_{\mathrm{Gas}}$ show the best correlation among all tested age bins, both including in the analysis the SF spaxels from AGN hosts or only those from control galaxies. The transformation equation is $\log(\Sigma\mathrm{SFR}_\star) = (0.872 \pm 0.004)\log(\Sigma\mathrm{SFR}_{\mathrm{Gas}}) - (0.075 \pm 0.006)$ or $\log(\Sigma\mathrm{SFR}_{\mathrm{Gas}}) = (1.147 \pm 0.005)\log(\Sigma\mathrm{SFR}_\star) + (0.086 \pm 0.080)$. This result opens a new way to obtain the SFRs in AGN hosts, even in the NLR and ENLR, were the AGN dominates the excitation of the emission lines and the SFR cannot be obtained directly from the H I line fluxes.'

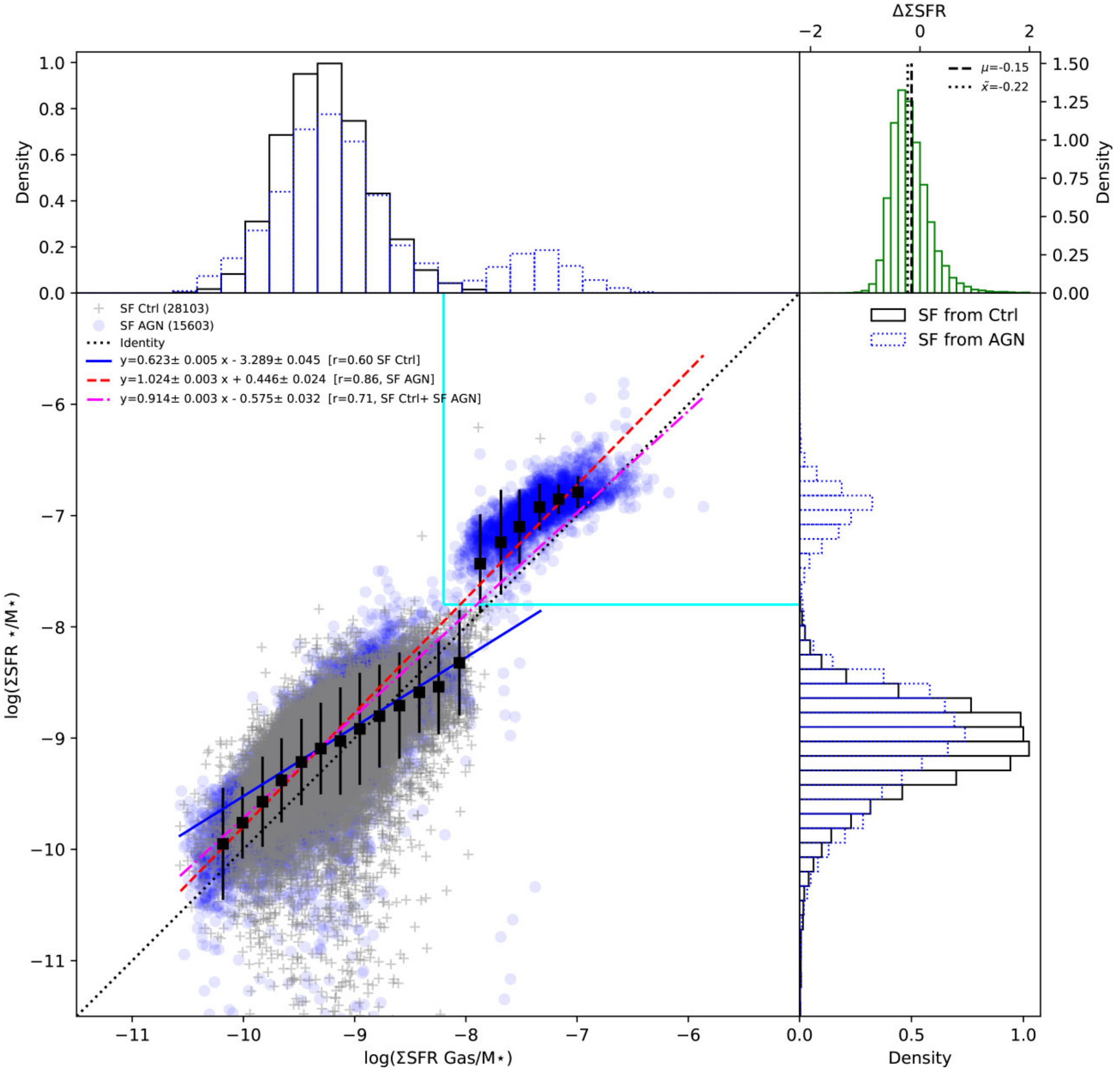

Figure 4. $\Sigma\mathrm{SFR}_{\mathrm{Gas}}$ *versus* $\Sigma\mathrm{SFR}_\star$ over the last 20 Myr normalized by stellar mass. Spaxels with SF line ratios taken from the control sample are grey plus symbols, SF spaxels taken from AGN hosts are light blue circles. Regressions over each data set are labelled. Squares represent the mean value with standard deviations of 20 linearly spaced bins over $\Sigma\mathrm{SFR}_{\mathrm{Gas}}$ (values below 0.5 and 99.5 of the q-th percentile were removed) considering all spaxels (SF from Ctrl and SF AGNs). Density histograms of both samples are also shown. The cyan rectangle represents the high $\Sigma\mathrm{SFR}/M_\star$ region, namely: $\log(\Sigma\mathrm{SFR}_g/M_\star) > -8.2$ and $\log(\Sigma\mathrm{SFR}_\star/M_\star) > -7.8$.

should be read as

(i) The $\Sigma\mathrm{SFR}_\star$ over the last 20 Myrs and $\Sigma\mathrm{SFR}_{\mathrm{Gas}}$ show the best correlation among all tested age bins, both including in the analysis the SF spaxels from AGN hosts or only those from control galaxies. The transformation equation is $\log(\Sigma\mathrm{SFR}_\star) = (0.870 \pm 0.004)\log(\Sigma\mathrm{SFR}_{\mathrm{Gas}}) + (0.007 \pm 0.006)$ or $\log(\Sigma\mathrm{SFR}_{\mathrm{Gas}}) = (1.149 \pm 0.005)\log(\Sigma\mathrm{SFR}_\star) - (0.008 \pm 0.008)$. This result opens a new way to obtain the SFRs in AGN hosts, even in the NLR and ENLR, were the AGN dominates the excitation of the emission lines and the SFR cannot be obtained directly from the H I line fluxes.

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