

# CO-CAVITY pilot survey: Molecular gas and star formation in void galaxies (Corrigendum)

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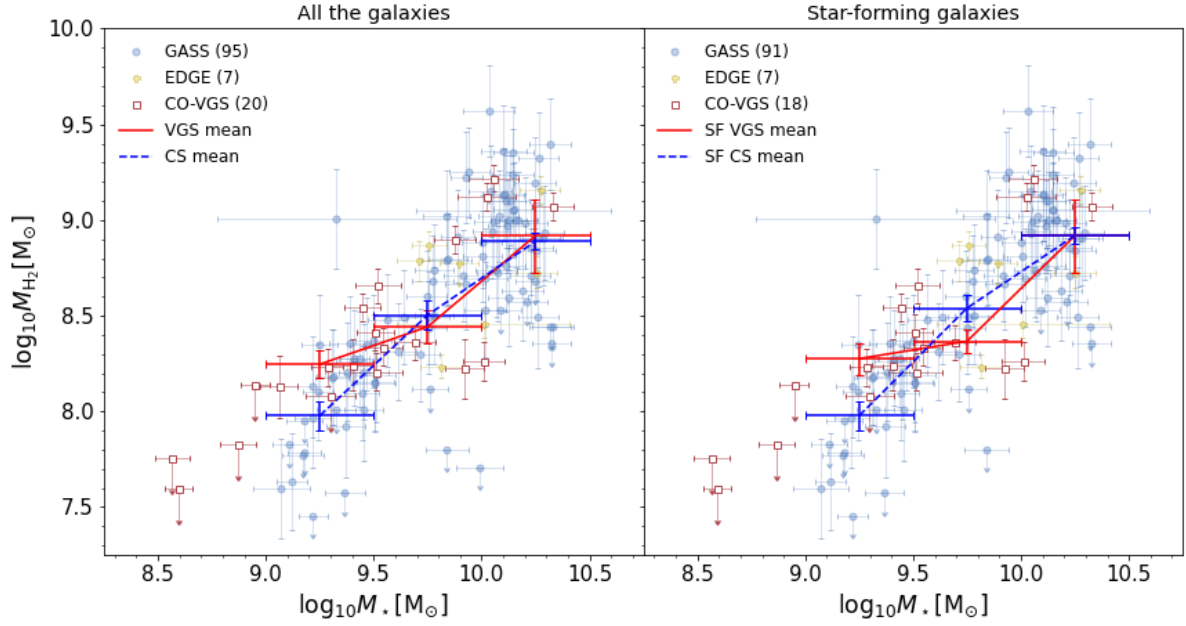
A&A, 658, A124 (2022), <https://doi.org/10.1051/0004-6361/202141888>

**Key words.** ISM: molecules – ISM: atoms – galaxies: star formation – Galaxy: evolution – large-scale structure of Universe – errata, addenda

We have noticed an error related to the CO-to-H<sub>2</sub> conversion factor ( $\alpha_{\text{CO}}$ ) for the extended CO Legacy Database for the GALEX Arcibo SDSS Survey (xCOLD-GASS, [Saintonge et al. 2017](#)) control sample in Sect. 2.2.2. We had indicated that the molecular gas masses of xCOLD-GASS that we used in our paper were based on a fixed  $\alpha_{\text{CO}} = 3.2 M_{\odot} (\text{K km s}^{-1} \text{pc}^2)^{-1}$ , the same as used for our void galaxies. This was wrong. We used the molecular gas data from the xCOLD-GASS sample presented in [Saintonge et al. \(2017\)](#). These data are based on a CO-to-H<sub>2</sub> conversion factor calibrated by [Accurso et al. \(2017\)](#), which is metallicity-dependent and has a second-order depen-

dence on the offset of a galaxy from the star-forming main sequence.

In order to provide a fair comparison between our void sample and xCOLD-GASS, we re-scaled the molecular gas mass of the xCOLD-GASS galaxies to the same value of the CO-to-H<sub>2</sub> conversion factor,  $\alpha_{\text{CO}}$ , as used for our void sample (a constant  $\alpha_{\text{CO}} = 3.2 M_{\odot} (\text{K km s}^{-1} \text{pc}^2)^{-1}$ , corresponding to the Galactic value, not taking into account the presence of helium). We show the figures and tables that have been affected by this correction. The main conclusions of our original paper are unaltered by these changes.

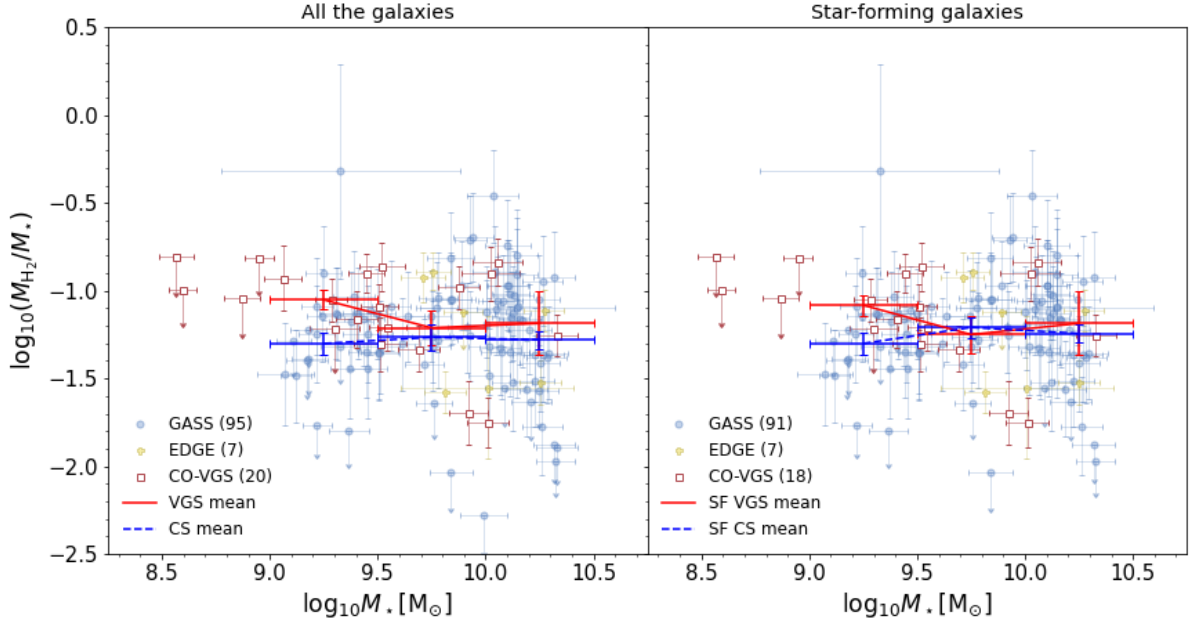


**Fig. 5.** Molecular gas mass as a function of stellar mass for the CO-VGS and CO-CS with all the galaxies (left) and only star-forming galaxies (right). The mean  $M_{\text{H}_2}$  per  $M_*$  bin is shown with a red symbol (connected by a solid red line to guide the eye) for the CO-VGS, and with a blue symbol (and dashed blue line) for the CO-CS. The error bar in  $M_*$  represents the width of the stellar mass bin.

**Table 10.** Comparison of molecular gas mass between CO-VGS (Void Galaxy Survey with CO data) and CO-CS (Control Sample with CO data).

$\log_{10} M_* [M_\odot]$		$\log_{10} M_{\text{H}_2} [M_\odot]$										
		CO-VGS				CO-CS			CO-VGS – CO-CS			
range	$n/n_{\text{up}}$	mean	median	$n/n_{\text{up}}$	mean	median	$\Delta\text{mean}$	$\sigma$	KS			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)			
ALL	9.0 – 9.5	5/1	8.25 ± 0.07	8.23	26/8	7.98 ± 0.08	8.09	0.27 ± 0.11	2.56	0.24		
	9.5 – 10.0	7/0	8.44 ± 0.09	8.36	29/4	8.50 ± 0.07	8.49	-0.06 ± 0.11	-0.53	0.34		
	10.0 – 10.5	4/0	8.92 ± 0.19	9.12	47/6	8.89 ± 0.04	8.94	0.03 ± 0.20	0.15	0.28		
	9.0 – 10.5	16/1	8.5 ± 0.09	8.36	102/18	8.52 ± 0.05	8.6	-0.02 ± 0.11	-0.19	0.21		
SF	9.0 – 9.5	4/1	8.28 ± 0.08	8.24	26/8	7.98 ± 0.08	8.09	0.30 ± 0.11	2.63	0.30		
	9.5 – 10.0	6/0	8.37 ± 0.06	8.34	28/3	8.54 ± 0.07	8.50	-0.17 ± 0.09	-1.90	0.10		
	10.0 – 10.5	4/0	8.92 ± 0.19	9.12	44/4	8.92 ± 0.04	8.94	<0.01 ± 0.20	<0.01	0.35		
	9.0 – 10.5	14/1	8.5 ± 0.1	8.34	98/15	8.54 ± 0.05	8.67	-0.04 ± 0.11	-0.38	0.2		

**Notes.** (1) Stellar mass range of the bin. (2) Number of CO-VGS galaxies in the bin.  $n_{\text{up}}$ : Number of upper limits of CO-VGS galaxies in the bin. (3) Mean logarithm of the molecular gas mass and its error of the CO-VGS galaxies in the bin. (4) Median logarithm of the molecular gas mass of the CO-VGS galaxies in the bin. (5) – (7) The same for the CO-CS sample. (8) Difference of the mean logarithmic of the molecular gas mass between CO-VGS and CO-CS ( $\Delta\text{mean}$ ) and its error ( $\text{err}(\Delta\text{mean})$ ). (9)  $\sigma = \Delta\text{mean}/\text{err}(\Delta\text{mean})$ . (10) p-value of the Kolmogorov-Smirnov test.

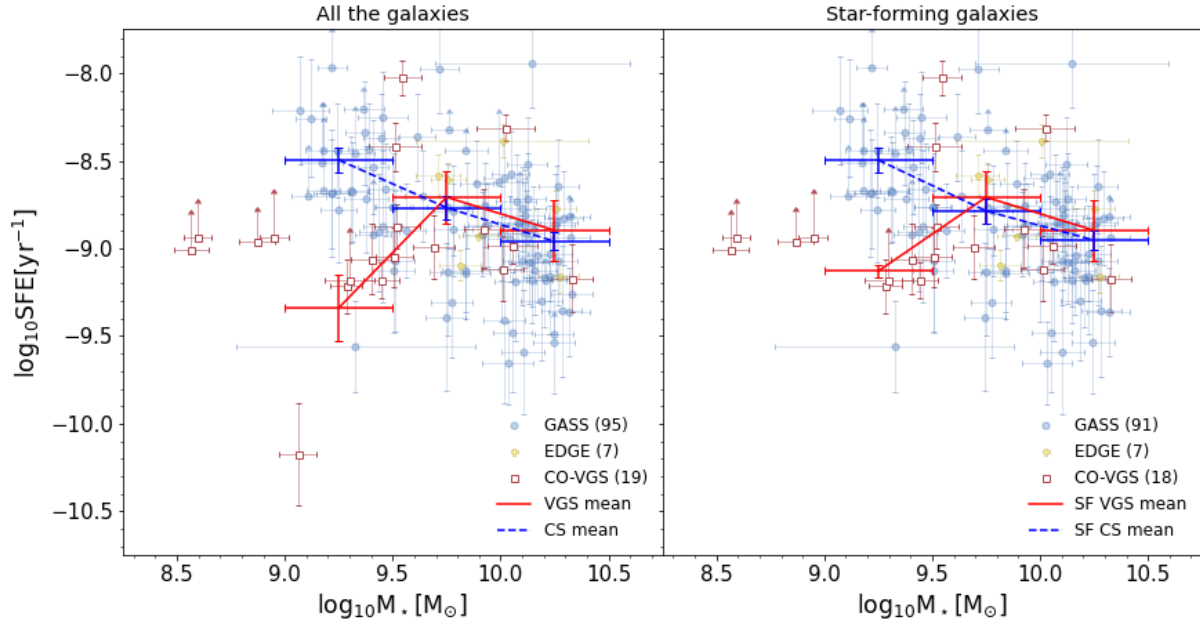


**Fig. 6.** Molecular gas mass fraction as a function of stellar mass for the CO-VGS and CO-CS with all the galaxies (left) and only star-forming galaxies (right). The mean  $M_{\text{H}_2}/M_*$  per  $M_*$  bin is shown with a red symbol (connected by a solid red line to guide the eye) for the CO-VGS, and with a blue symbol (and dashed blue line) for the CO-CS. The error bar in  $M_*$  represents the width of the stellar mass bin.

**Table 11.** Molecular gas mass fraction.

$\log_{10} M_* [M_\odot]$		$\log_{10}(M_{\text{H}_2}/M_*)$									
		CO-VGS				CO-CS			CO-VGS – CO-CS		
range	$n/n_{\text{up}}$	mean	median	$n/n_{\text{up}}$	mean	median	$\Delta\text{mean}$	$\sigma$	KS		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)		
9.0 – 9.5	5/1	-1.05 ± 0.06	-1.05	26/8	-1.30 ± 0.06	-1.25	0.25 ± 0.09	2.92	0.12		
9.5 – 10.0	7/0	-1.21 ± 0.10	-1.21	29/4	-1.27 ± 0.08	-1.21	0.05 ± 0.12	0.44	1.00		
10.0 – 10.5	4/0	-1.19 ± 0.18	-0.90	47/6	-1.28 ± 0.05	-1.19	0.09 ± 0.19	0.50	0.43		
9.0 – 10.5	16/1	-1.17 ± 0.07	-1.09	102/18	-1.32 ± 0.04	-1.22	0.14 ± 0.08	1.72	0.4		
9.0 – 9.5	4/1	-1.08 ± 0.06	-1.05	26/8	-1.30 ± 0.06	-1.25	0.22 ± 0.09	2.47	0.19		
9.5 – 10.0	6/0	-1.25 ± 0.10	-1.30	28/3	-1.21 ± 0.06	-1.15	-0.04 ± 0.12	-0.34	0.95		
10.0 – 10.5	4/0	-1.19 ± 0.18	-0.90	44/4	-1.24 ± 0.05	-1.17	0.06 ± 0.19	0.31	0.49		
9.0 – 10.5	14/1	-1.2 ± 0.08	-1.21	98/15	-1.26 ± 0.04	-1.19	0.06 ± 0.09	0.67	0.76		

**Notes.** (1) Stellar mass range of the bin. (2) Number of CO-VGS galaxies in the bin.  $n_{\text{up}}$ : Number of upper limits of CO-VGS galaxies in the bin. (3) Mean logarithm of the molecular gas mass fraction and its error of the CO-VGS galaxies in the bin. (4) Median logarithm of the molecular gas mass fraction of the CO-VGS galaxies in the bin. (5) – (7) The same for the CO-CS sample. (8) Difference of the mean logarithmic of the molecular gas mass fraction between CO-VGS and CO-CS ( $\Delta\text{mean}$ ) and its error ( $\text{err}(\Delta\text{mean})$ ). (9)  $\sigma = \Delta\text{mean}/\text{err}(\Delta\text{mean})$ . (10) p-value of the Kolmogorov-Smirnov test applied inside the bin to compare the CO-VGS and the CO-CS.

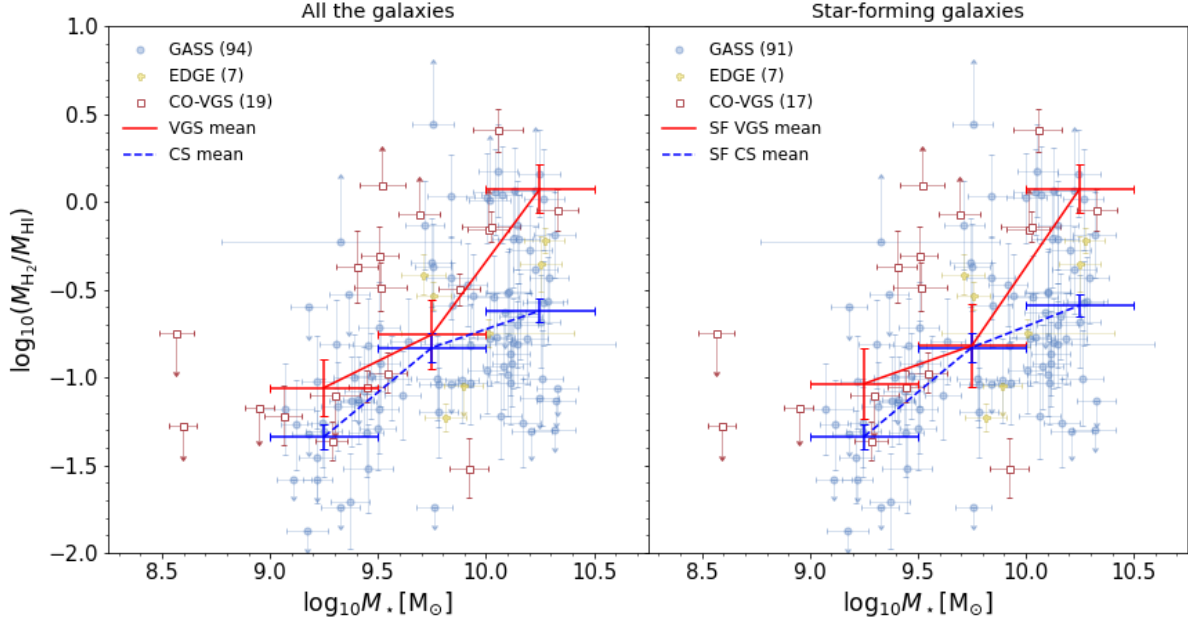


**Fig. 7.** Star formation efficiency (SFE) as a function of stellar mass for the CO-VGS and CO-CS with all the galaxies (left) and only star-forming galaxies (right). The mean SFE per  $M_*$  bin is shown with a red symbol (connected by a solid red line to guide the eye) for the CO-VGS, and with a blue symbol (and dashed blue line) for the CO-CS. The error bar in  $M_*$  represents the width of the stellar mass bin.

**Table 12.** Star formation efficiency.

$\log_{10} M_* [M_\odot]$		$\log_{10} \text{SFE} [\text{yr}^{-1}]$									
		CO-VGS				CO-CS			CO-VGS – CO-CS		
range	$n/n_{\text{up}}$	mean	median	$n/n_{\text{up}}$	mean	median	$\Delta\text{mean}$	$\sigma$	KS		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)		
ALL	9.0 – 9.5	5/0	-9.34 ± 0.19	-9.18	26/0	-8.49 ± 0.07	-8.44	-0.84 ± 0.20	-4.18	<0.01	
	9.5 – 10.0	6/1	-8.71 ± 0.15	-8.87	29/0	-8.77 ± 0.07	-8.77	0.06 ± 0.17	0.36	0.50	
	10.0 – 10.5	4/0	-8.90 ± 0.17	-9.12	47/0	-8.96 ± 0.05	-8.91	0.06 ± 0.18	0.35	0.87	
	9.0 – 10.5	15/1	-8.95 ± 0.13	-8.99	102/0	-8.78 ± 0.04	-8.78	-0.17 ± 0.13	-1.29	0.11	
SF	9.0 – 9.5	4/0	-9.13 ± 0.04	-9.18	26/0	-8.49 ± 0.07	-8.44	-0.63 ± 0.08	-8.02	<0.01	
	9.5 – 10.0	6/0	-8.71 ± 0.15	-8.87	28/0	-8.79 ± 0.07	-8.79	0.08 ± 0.16	0.48	0.74	
	10.0 – 10.5	4/0	-8.90 ± 0.17	-9.12	44/0	-8.95 ± 0.05	-8.91	0.06 ± 0.18	0.31	0.89	
	9.0 – 10.5	14/0	-8.86 ± 0.1	-8.99	98/0	-8.78 ± 0.04	-8.78	-0.08 ± 0.11	-0.78	0.07	

**Notes.** (1) Stellar mass range of the bin. (2) Number of CO-VGS galaxies in the bin.  $n_{\text{up}}$ : Number of upper limits of CO-VGS galaxies in the bin. (3) Mean logarithm of the star formation efficiency and its error of the CO-VGS galaxies in the bin. (4) Median logarithm of the star formation efficiency of the CO-VGS galaxies in the bin. (5) – (7) The same for the CO-CS sample. (8) Difference of the mean logarithmic of the star formation efficiency between CO-VGS and CO-CS ( $\Delta\text{mean}$ ) and its error ( $\text{err}(\Delta\text{mean})$ ). (9)  $\sigma = \Delta\text{mean}/\text{err}(\Delta\text{mean})$ . (10) p-value of the Kolmogorov-Smirnov test.



**Fig. 9.** Molecular-to-atomic gas mass ratio as a function of stellar mass for the CO-VGS and the CO-CS with all the galaxies (left) and only star-forming galaxies (right). The mean  $M_{\text{H}_2}/M_{\text{HI}}$  per  $M_*$  bin is calculated taking upper limits into account but not lower ones, and it is shown with a red symbol (connected by a solid red line to guide the eye) for the CO-VGS, and with a blue symbol (and dashed blue line) for the CO-CS. The error bar in  $M_*$  represents the width of the stellar mass bin.

**Table 14.** Molecular-to-atomic gas mass ratio.

$\log_{10} M_* [M_\odot]$		$\log_{10}(M_{\text{H}_2}/M_{\text{HI}})$ (Upper limits)								
		CO-VGS			CO-CS			CO-VGS – CO-CS		
range	$n/n_{\text{up}}$	mean	median	$n/n_{\text{up}}$	mean	median	$\Delta\text{mean}$	$\sigma$	KS	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	
ALL	9.0 – 9.5	5/1	-1.06 ± 0.16	-1.22	25/8	-1.34 ± 0.07	-1.27	0.28 ± 0.18	1.58	0.84
	9.5 – 10.0	5/0	-0.75 ± 0.20	-0.50	27/3	-0.83 ± 0.08	-0.92	0.07 ± 0.21	0.35	0.25
	10.0 – 10.5	3/0	0.08 ± 0.14	-0.05	45/6	-0.62 ± 0.07	-0.68	0.70 ± 0.15	4.55	0.01
	9.0 – 10.5	13/1	-0.69 ± 0.16	-0.5	97/17	-0.88 ± 0.05	-0.92	0.19 ± 0.17	1.14	0.05
SF	9.0 – 9.5	4/1	-1.04 ± 0.20	-1.05	25/8	-1.34 ± 0.07	-1.27	0.30 ± 0.22	1.40	0.51
	9.5 – 10.0	4/0	-0.82 ± 0.23	-0.48	27/3	-0.83 ± 0.08	-0.92	0.01 ± 0.25	0.04	0.35
	10.0 – 10.5	3/0	0.08 ± 0.14	-0.05	43/4	-0.59 ± 0.07	-0.65	0.66 ± 0.15	–	–
	9.0 – 10.5	11/1	-0.66 ± 0.18	-0.48	95/15	-0.87 ± 0.05	-0.92	0.21 ± 0.19	1.07	0.05

**Notes.** Means have been calculated taking upper limits into account, but not lower limits. (1) Stellar mass range of the bin. (2) Number of CO-VGS galaxies in the bin.  $n_{\text{up}}$ : Number of upper limits of CO-VGS galaxies in the bin. (3) Mean logarithm of the molecular-to-atomic gas mass ratio and its error of the CO-VGS galaxies in the bin. (4) Median logarithm of the molecular-to-atomic gas mass ratio of the CO-VGS galaxies in the bin. (5) – (7) The same for the CO-CS sample. (8) Difference of the mean logarithmic of the molecular-to-atomic gas mass ratio between CO-VGS and CO-CS ( $\Delta\text{mean}$ ) and its error ( $\text{err}(\Delta\text{mean})$ ). (9)  $\sigma = \Delta\text{mean}/\text{err}(\Delta\text{mean})$ , only reported when there are at least four objects in each sample. (10) p-value of the Kolmogorov-Smirnov test.

## References

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