

IASI L2
integrated ozone monitoring
against ground-based Brewer
spectrophotometer measurements

Monthly report for February 2023,
Platform: M01,
GroundSegment: GS1

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1 INTRODUCTION

1.1 Purpose and scope

This report compiles Monthly statistics from the routine monitoring of the IASI L2 integrated ozone [RD 1] product with *ground-based* brewer spectrophotometer measurements.

The IASI L2 products come from the operational ground segment GS1. The reference measurements are retrieved from EUBrewNet [RD 3]. The collocation and statistics are computed with the MONALiSA monitoring facility [RD 4].

This document is intended for internal monitoring purposes, to characterise and detect possible changes or trends in performances. It is also a public report to Users interested in IASI L2 integrated ozone product uncertainties. In this respect, it is important to note that differences with EUBrewNet also include uncertainties of the EUBrewNet measurements themselves as well as collocation uncertainties. These come from the representativeness of a point measurements vs the 12-40 km footprint of IASI and from the spatial and temporal lags between EUBrewNet and satellite acquisitions.

1.2 Collocation criteria and data selection

All IASI pixels within 1 h and 50 km from the sites are collocated to the EUBrewNet measurement and stored in a match-up database.

The statistics are then computed globally for successfully processed pixels with the statistical retrieval method. The quality control on the IASI L2 products retains products with quality indicators (uncertainty estimates) better than 7 percent relative error for Integrated Ozone.

1.3 Reference Documents

ID	Title	Reference
[RD 1]	"IASI Level 2 Product Generation Specifications"	EPS.SYS.SPE.990013
[RD 2]	"IASI Level 2 Product Guide"	EUM/OPS-EPS/MAN/04/0033
[RD 3]	"European Brewer Network [EUBrewNet]"	http://rbcce.aemet.es/eubrewnet
[RD 4]	"MONALiSA Software Release Note"	EUM/RSP/TEN/17/930189

1.4 Terminology

- M01 : Metop B
- M02 : Metop A
- M03 : Metop C
- Ground Segment 1 (GS1) : operational
- Ground Segment 2 (GS2) : validation

- Ground Segment 3 (GS3) : experiment

1.5 MONALiSA

- Version : v3.6-23-g121f7b0
- GitHash : 121f7b0d030eed6226c8b66594a8afb523e52d35

2 GLOBAL MONTHLY STATISTICS IN ALL-SKY CONDITION

2.1 Global matchups

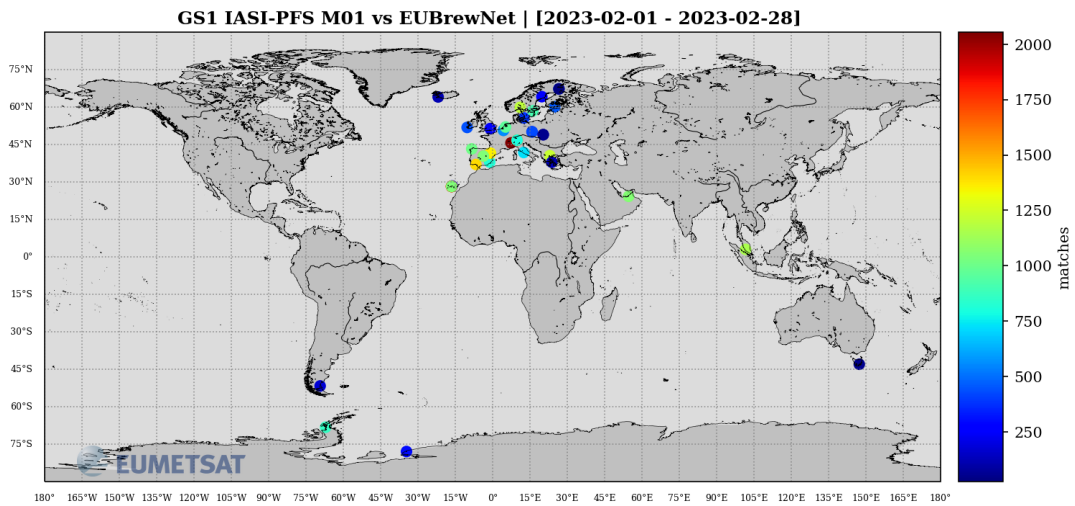


Figure 2.1: Number of match-ups per stations with M01 IASI L2 from GS1 for 01-28/02/2023

2.2 Global monthly time series



**GS1 IASI-PFS M01 vs EUBrewNet Total Column Ozone
 [2023-02-01 - 2023-02-28]**

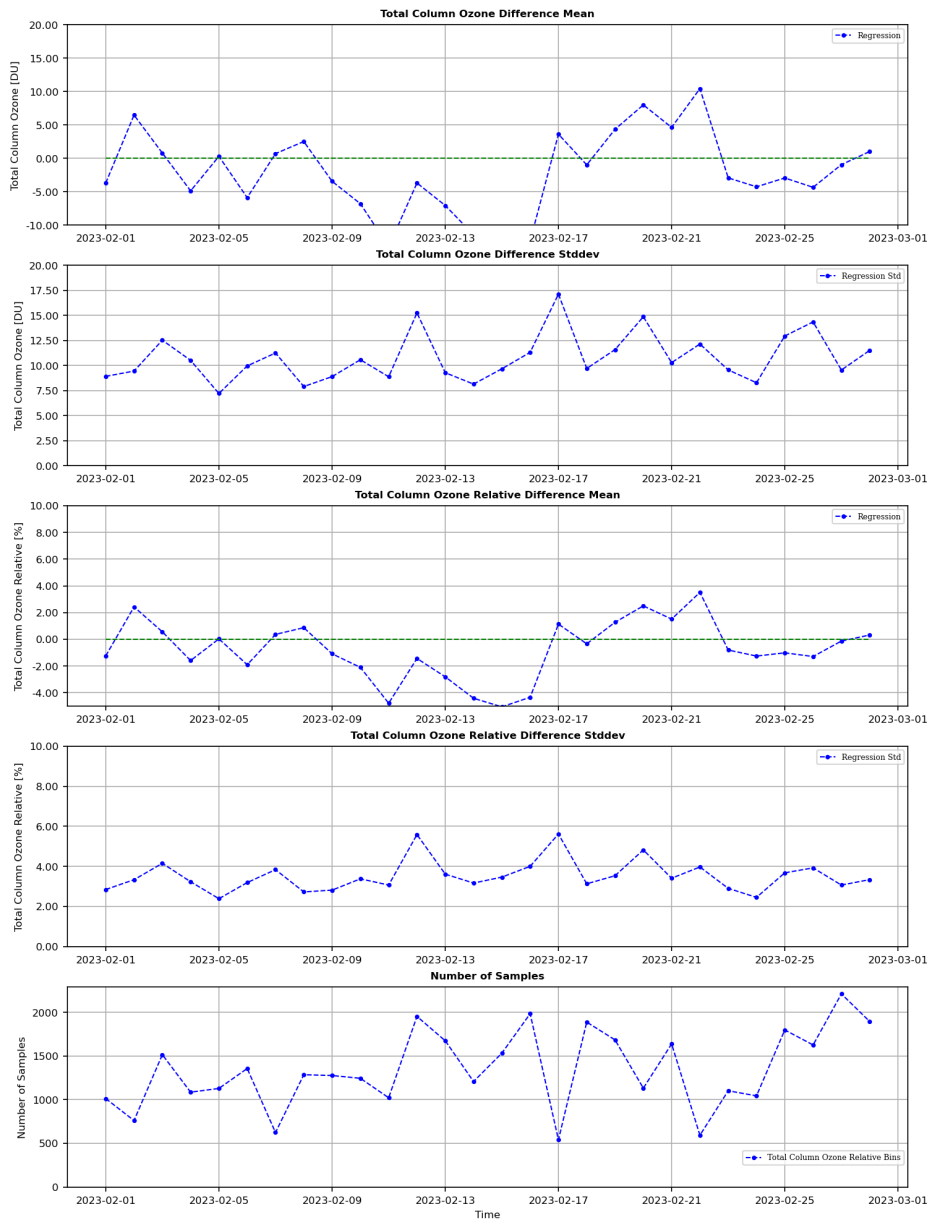


Figure 2.2: Monthly time series of mean difference and standard deviation in absolute Dobsen Unit (top 2 panels) and relative Difference (middle 2 panels) between IASI L2 and EUBrewNet. The bottom panel shows the number of Monthly match-ups. Global statistics with M01 IASI L2 from GS1 for 01-28/02/2023

2.3 Global long-term time series



**GS1 IASI-PFS M01 vs EUBrewNet Total Column Ozone
 [2019-09-01 - 2023-02-28]**

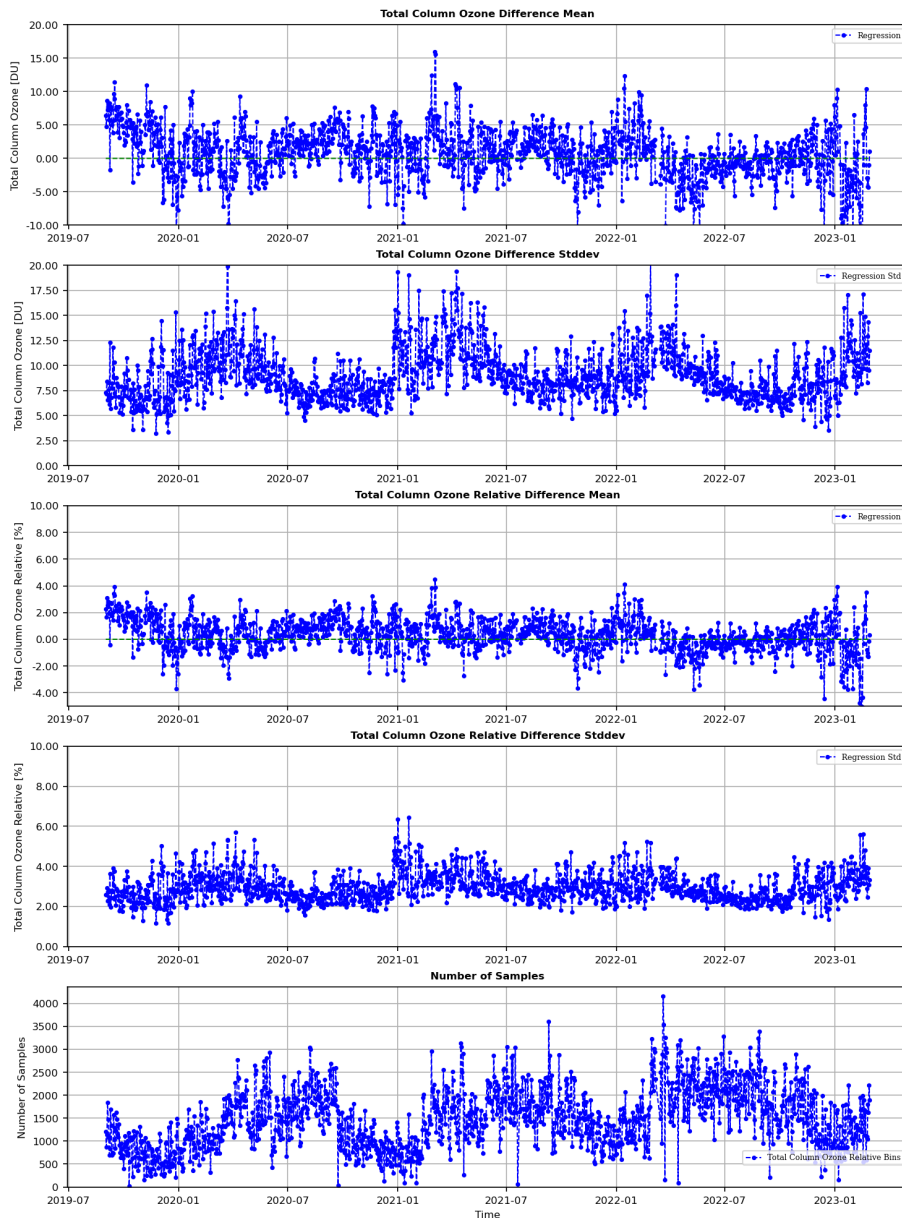


Figure 2.3: Long-term time series of mean difference and standard deviation in absolute Dobson Unit (top 2 panels) and relative Difference (middle 2 panels) between IASI L2 and EUBrewNet. The bottom panel shows the number of Monthly match-ups. Global statistics with M01 IASI L2 from GS1 for 01-28/02/2023

2.4 Global histograms

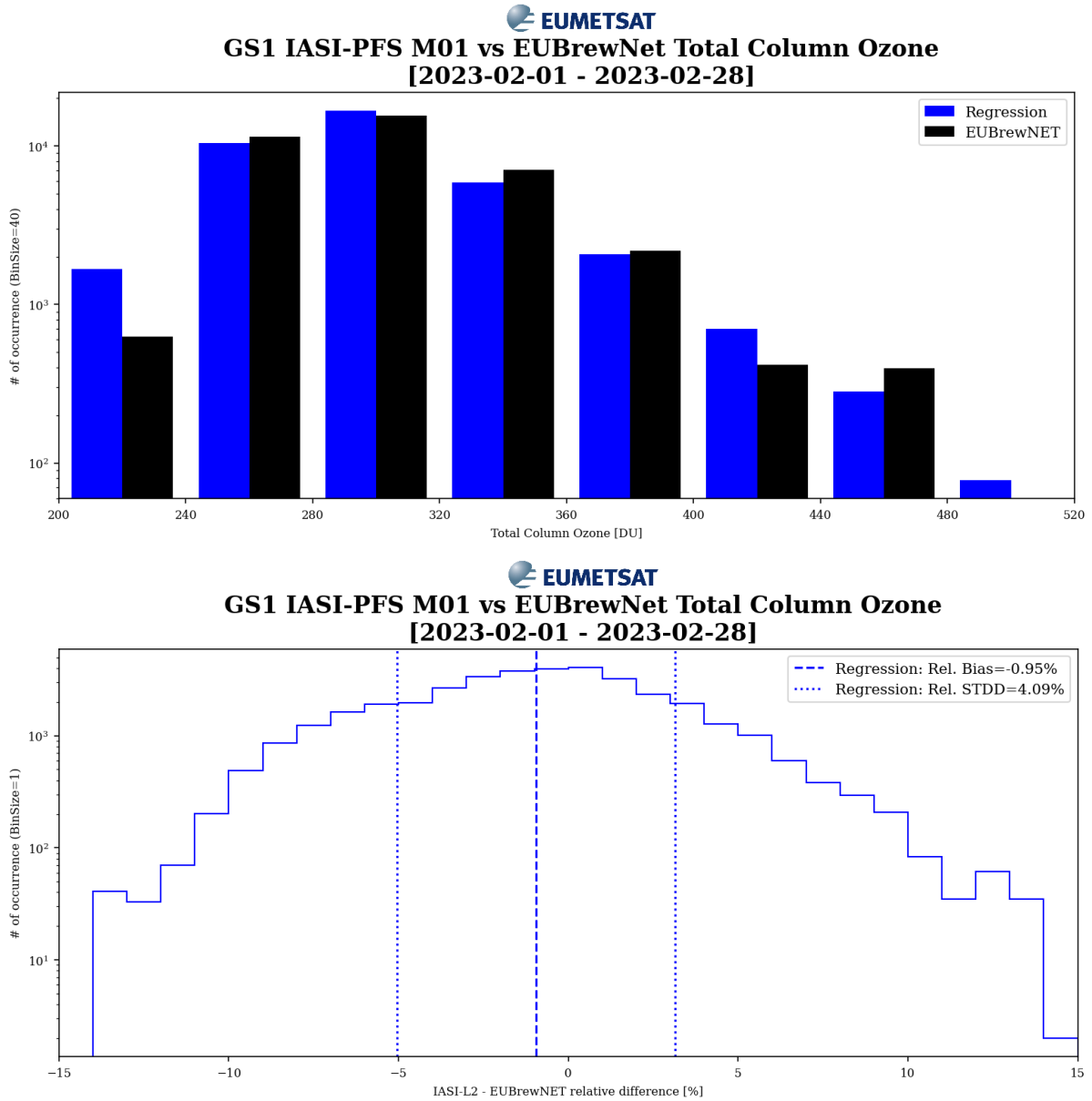


Figure 2.4: Histograms as barcharts for absolute Dobson Unit (top) and relative differences (bottom) between IASI L2 integrated Ozone and EuBrewNet (ylog), with M01 IASI L2 from GS1 for 01-28/02/2023

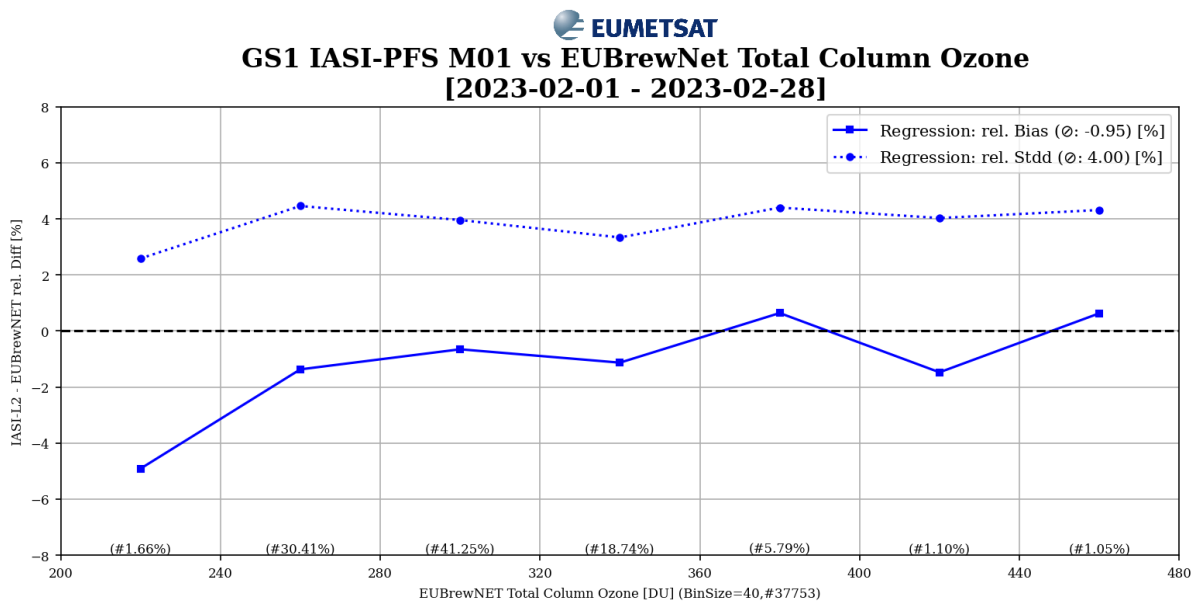
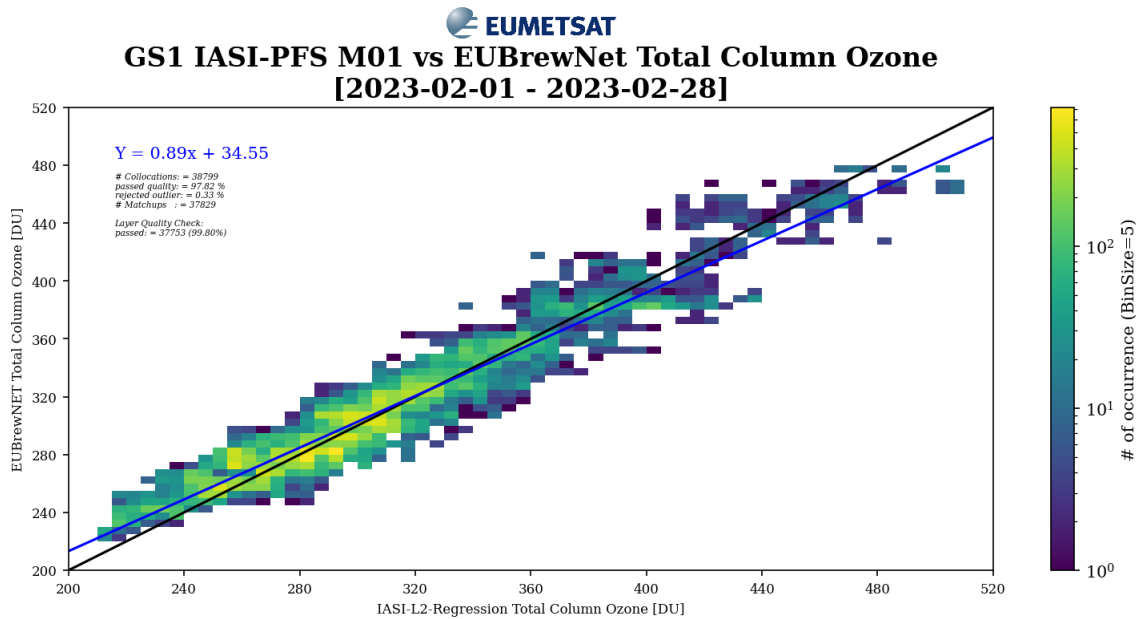


Figure 2.5: 2D Histogram (top) and bias and standard deviation as per 20DU bin of the EUBrewNet reference (bottom) between IASI L2 integrated Ozone and EuBrewNet measurements, with M01 IASI L2 from GS1 for 01-28/02/2023

2.4.1 Collocational dependencies

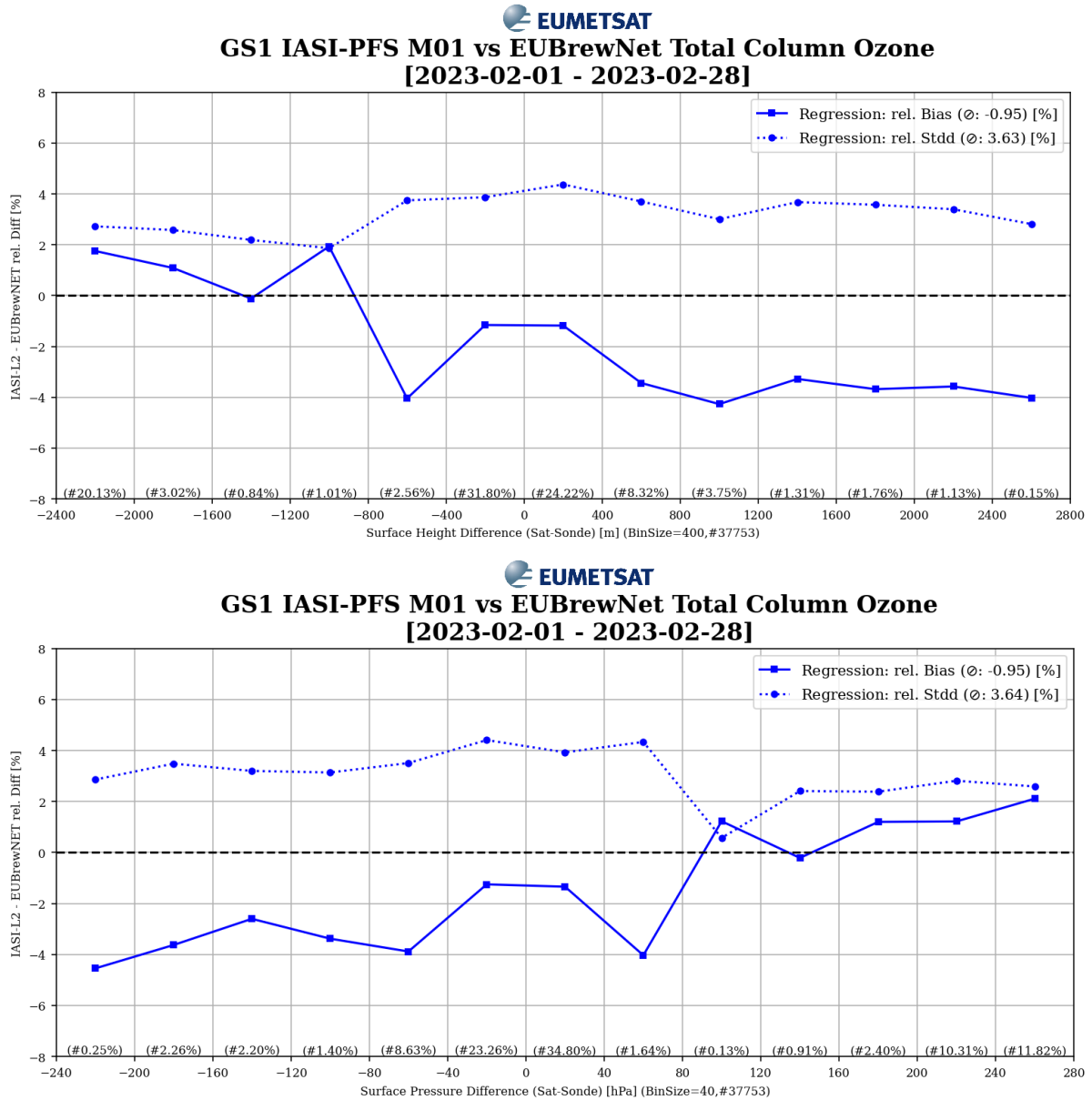


Figure 2.6: Relative bias and standard deviation histograms between IASI L2 Precipitable Water and EUBrewNet (ylog), with M01 IASI L2 from GS1 for 01-28/02/2023 for different surface height (top) and surface pressure differences (bottom).

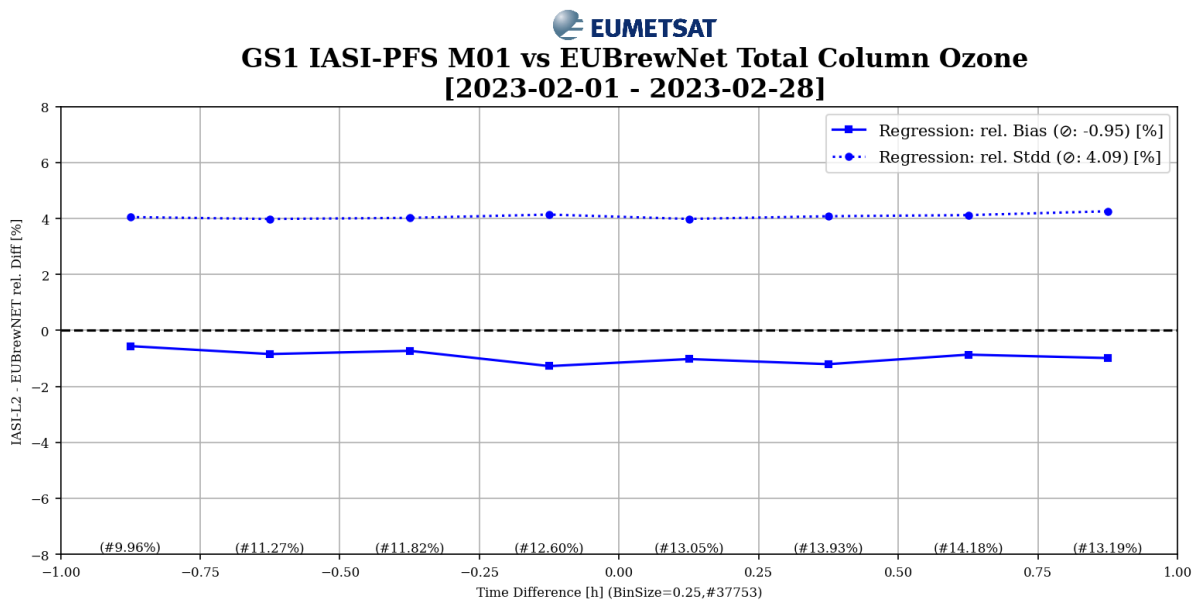
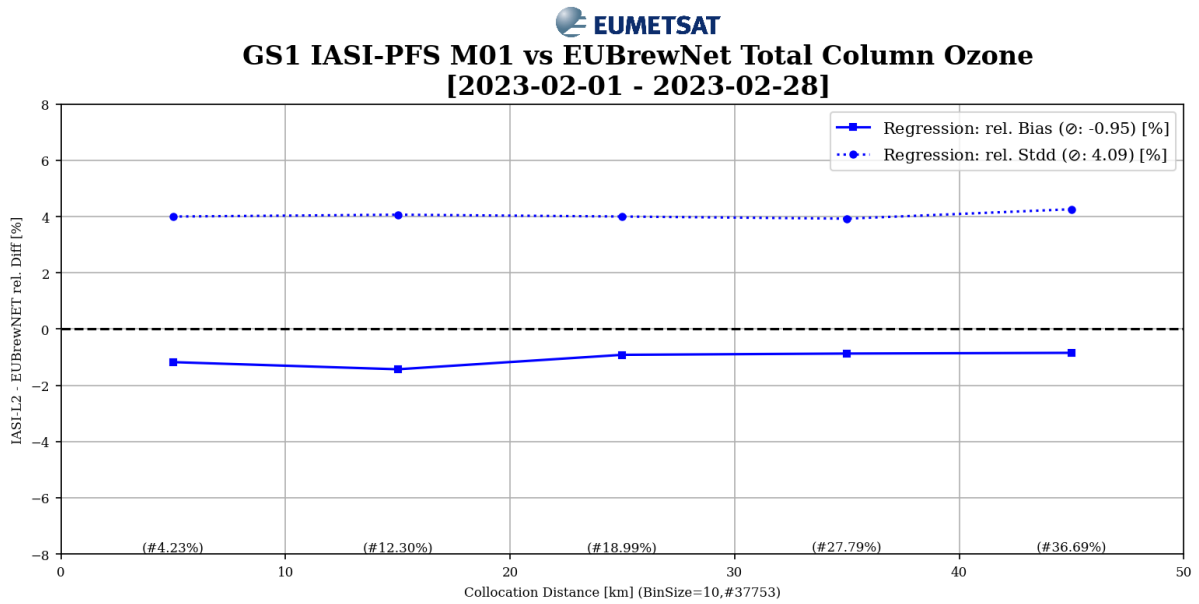


Figure 2.7: Relative bias and standard deviation histograms between IASI L2 Precipitable Water and EUBrewNet (ylog), with M01 IASI L2 from GS1 for 01-28/02/2023 for different collocation spatial distances (top) and temporal differences (bottom).

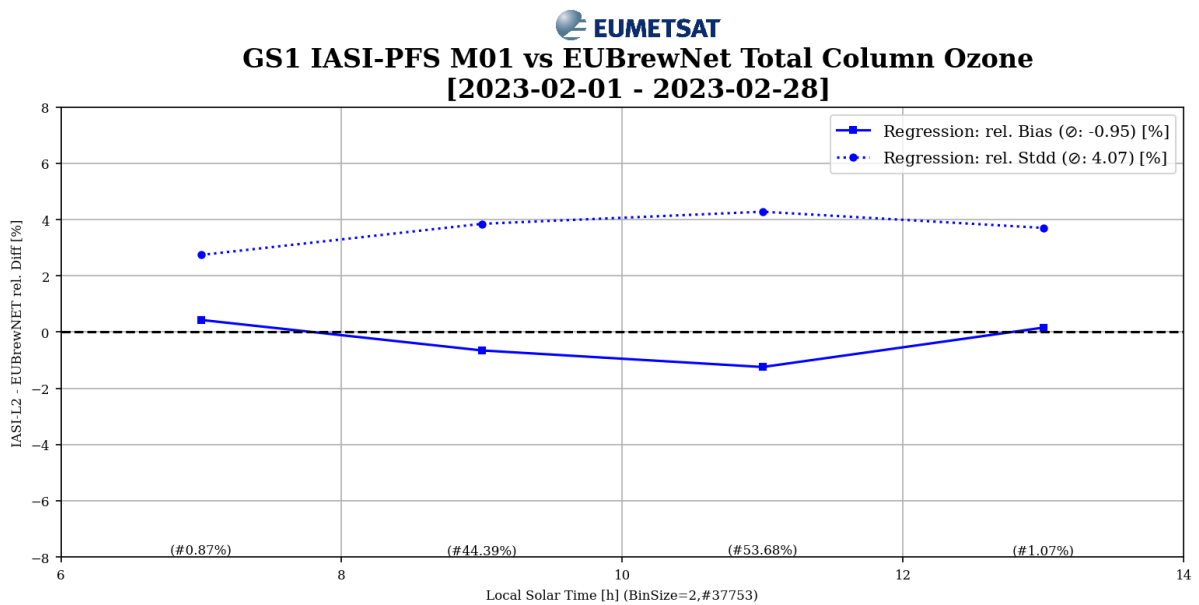
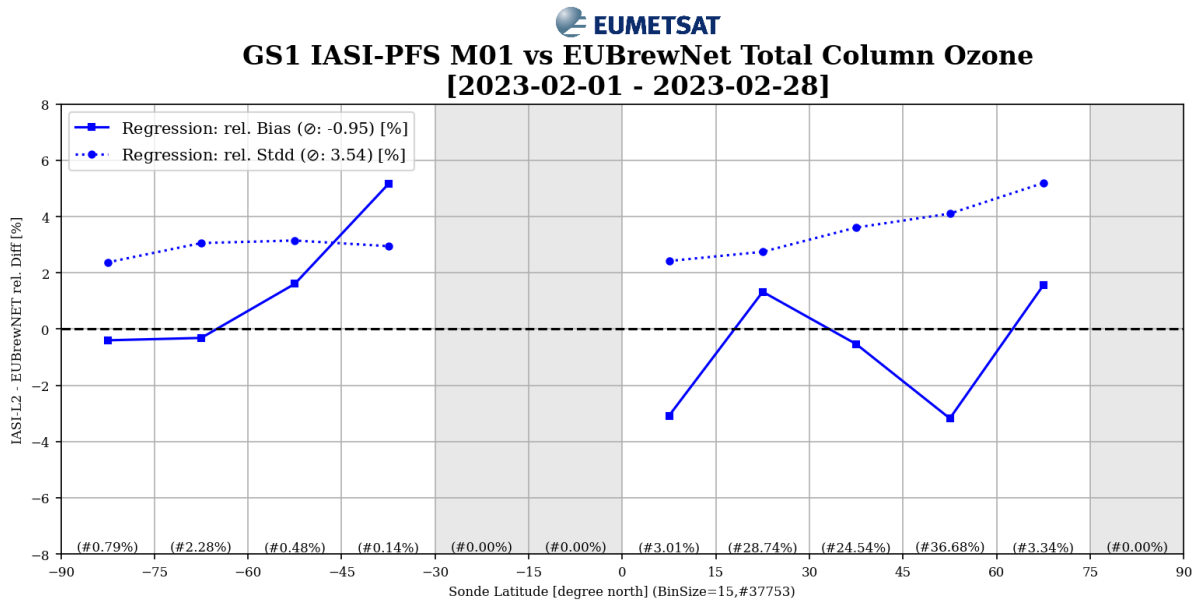


Figure 2.8: Relative bias and standard deviation histograms between IASI L2 Precipitable Water and EUBrewNet (ylog), with M01 IASI L2 from GS1 for 01-28/02/2023 for different latitudes (top) and local solar times (bottom).

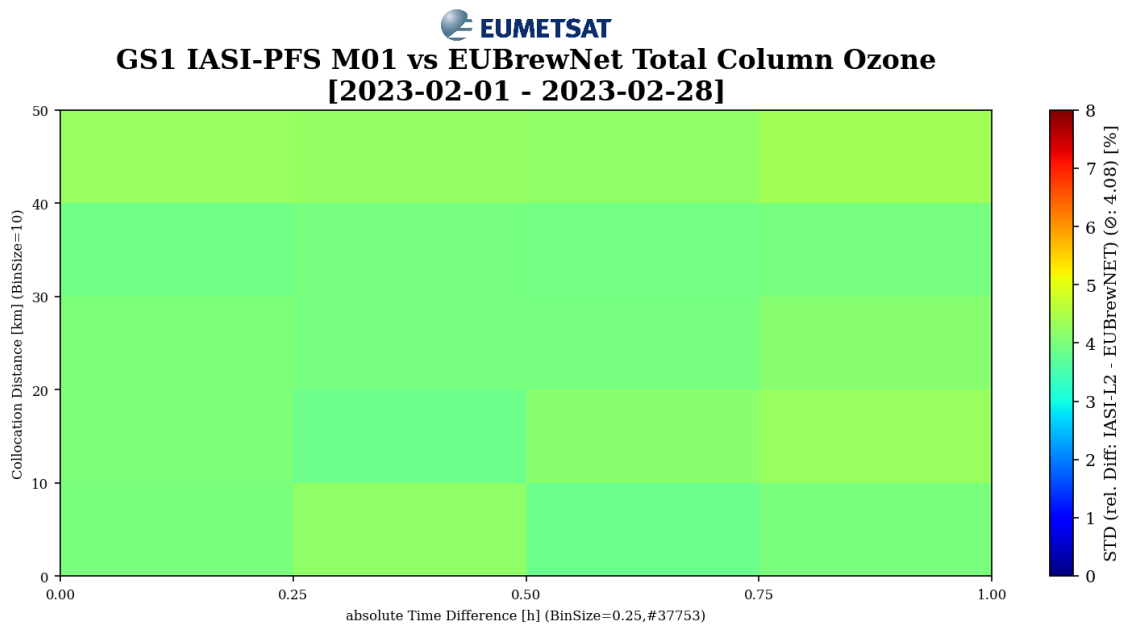
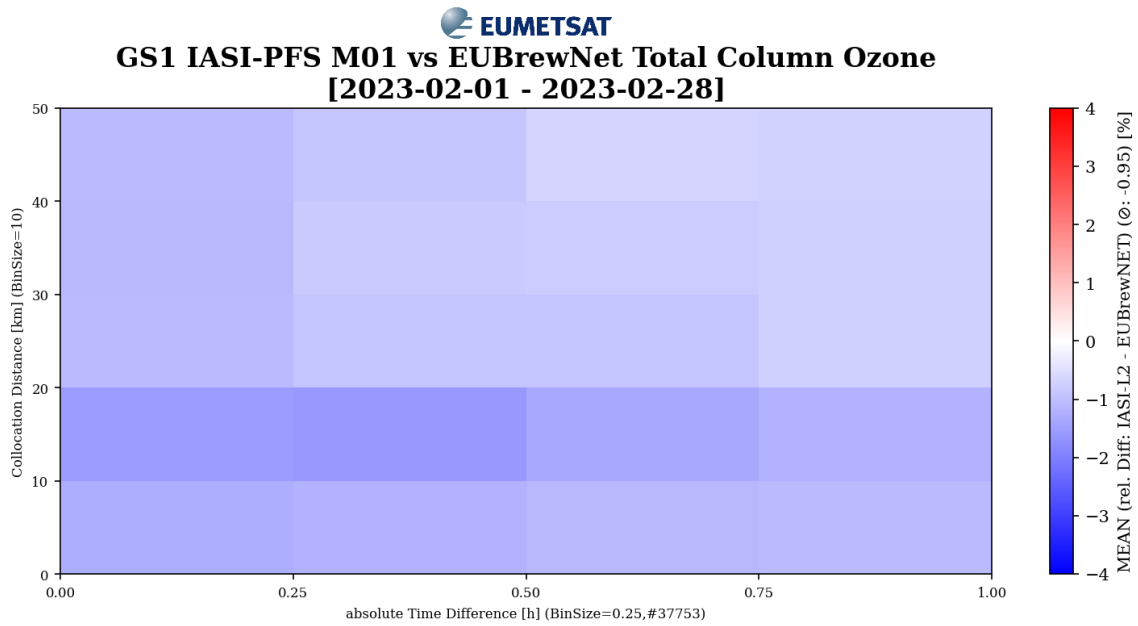


Figure 2.9: 2D Histograms bias (top) and standard deviation (bottom) for IASI L2 Precipitable Water and EUBrewNet measurements, with M01 IASI L2 from GS1 for 01-28/02/2023 dependent of collocation temporal difference and spatial distances.

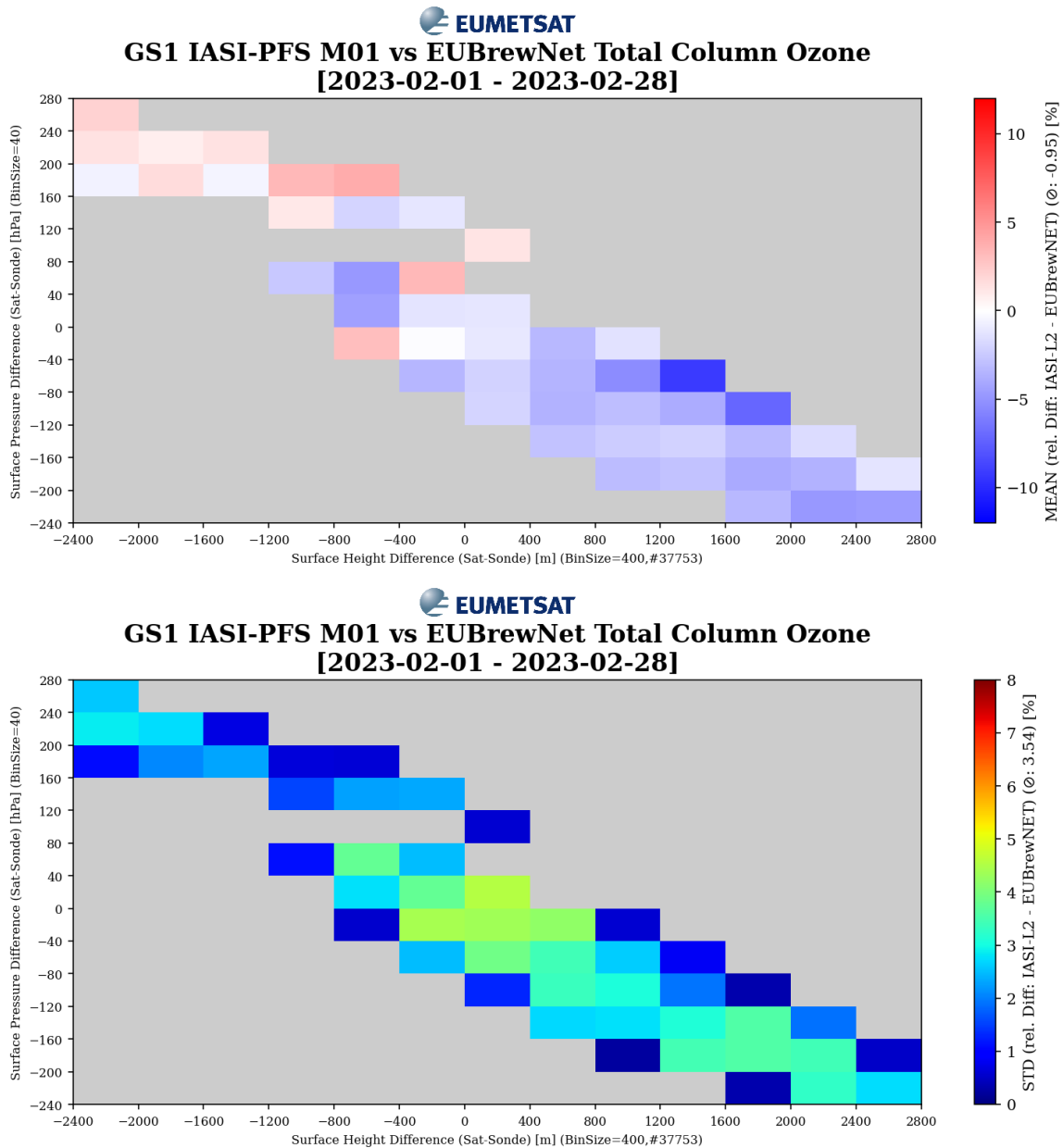


Figure 2.10: 2D Histograms bias (top) and standard deviation (bottom) for IASI L2 Precipitable Water and EUBrewNet measurements, with M01 IASI L2 from GS1 for 01-28/02/2023 dependent of Surface Pressure Difference and Surface Pressure Difference.

2.4.2 Angular dependencies

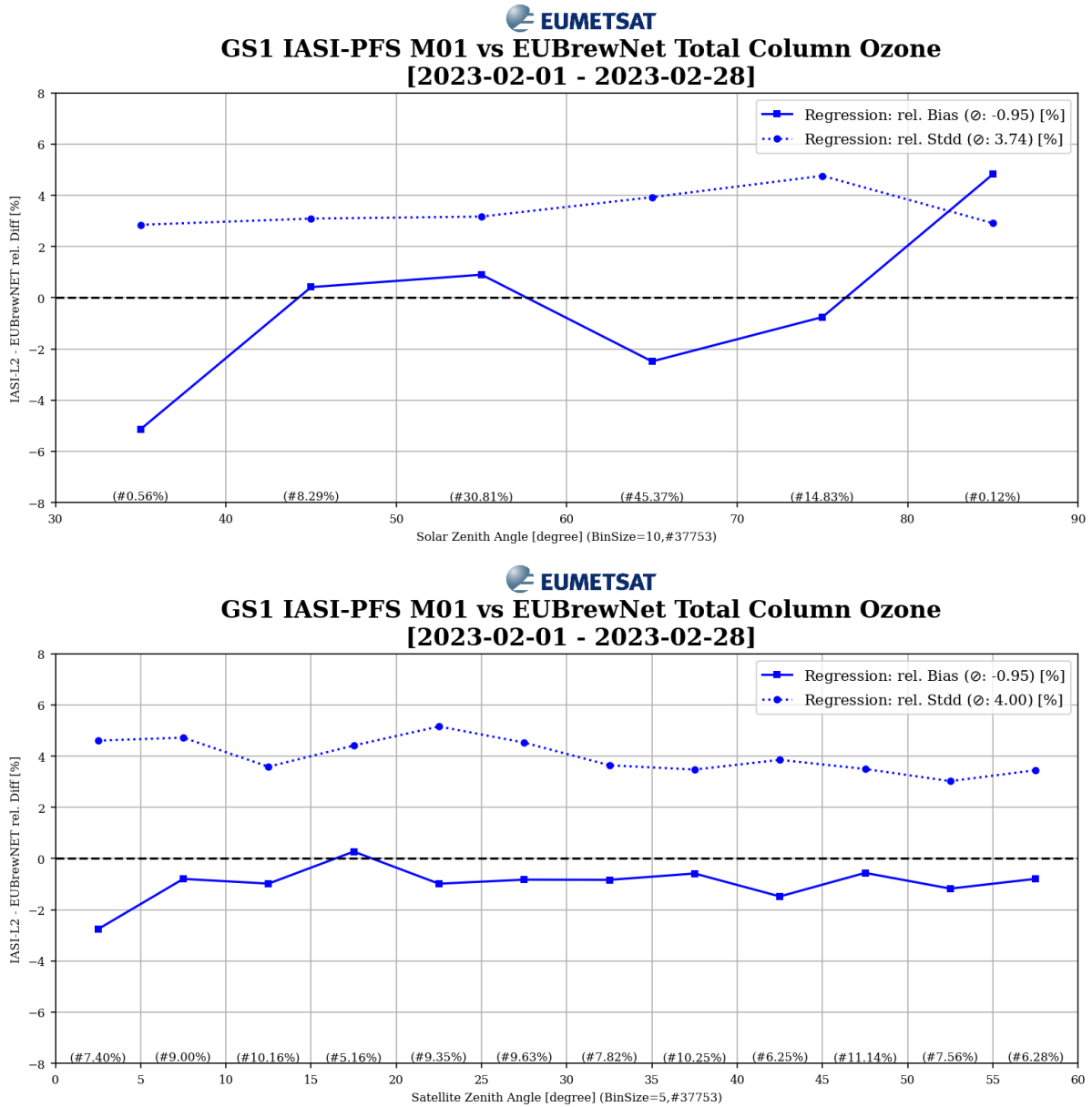


Figure 2.11: Relative bias and standard deviation histograms between IASI L2 Precipitable Water and EUBrewNet (ylog), with M01 IASI L2 from GS1 for 01-28/02/2023 for different sun zenith angles (top) and satellite zenith angles (bottom).

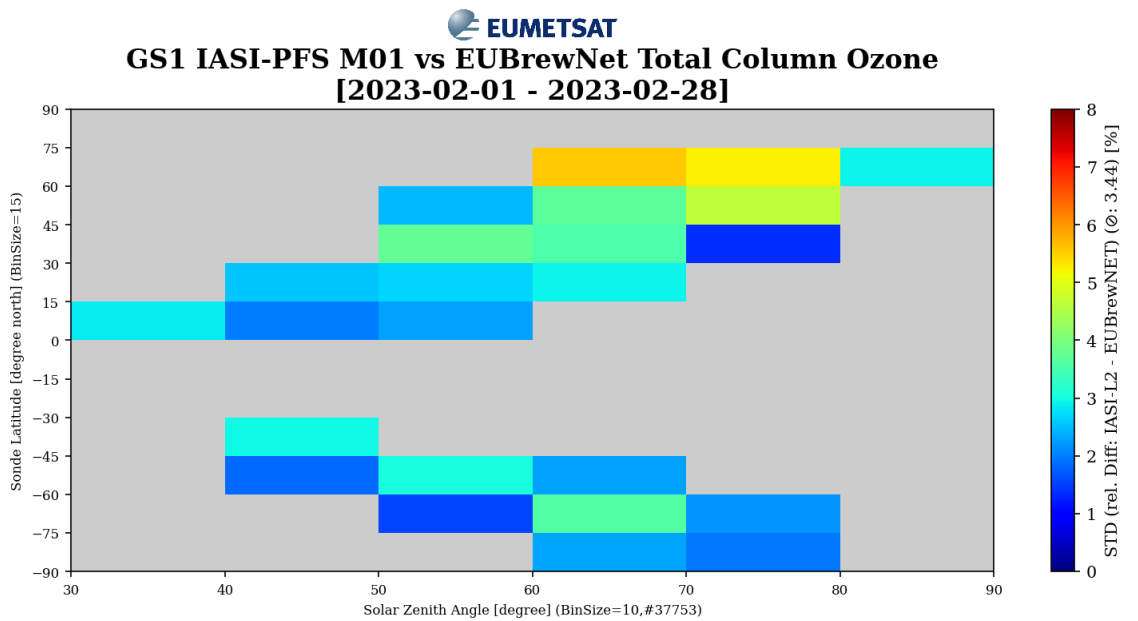
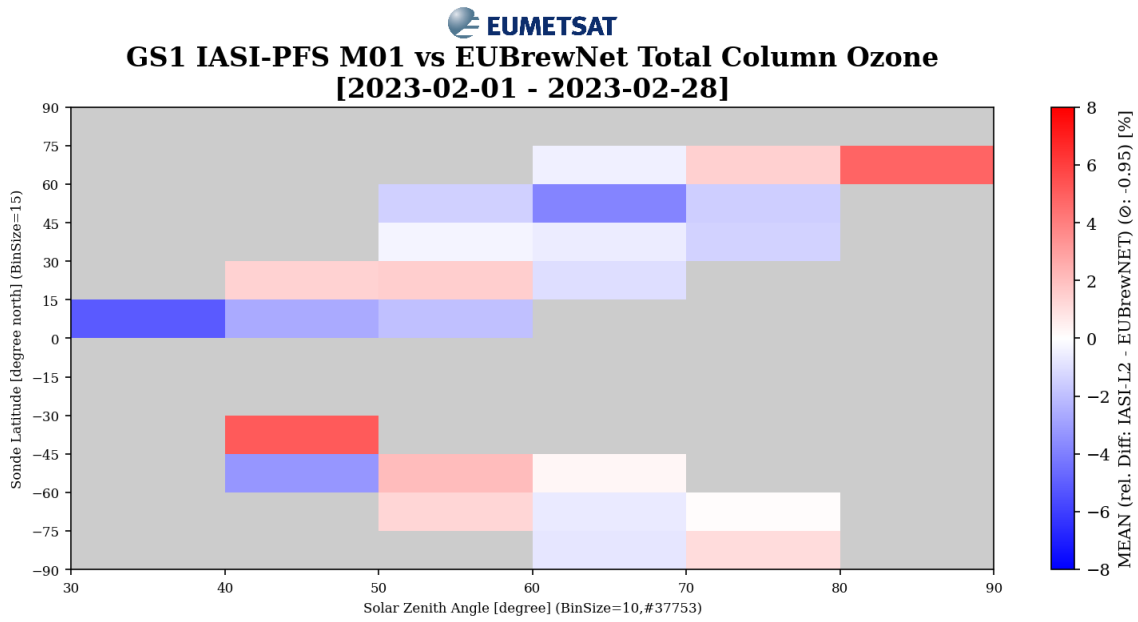


Figure 2.12: 2D Histograms bias (top) and standard deviation (bottom) for IASI L2 Precipitable Water and EUBrewNet measurements, with M01 IASI L2 from GS1 for 01-28/02/2023 dependent of sun zenith angles and latitude.

3 MONTHLY STATISTICS PER STATION

3.1 Ozone relative difference maps

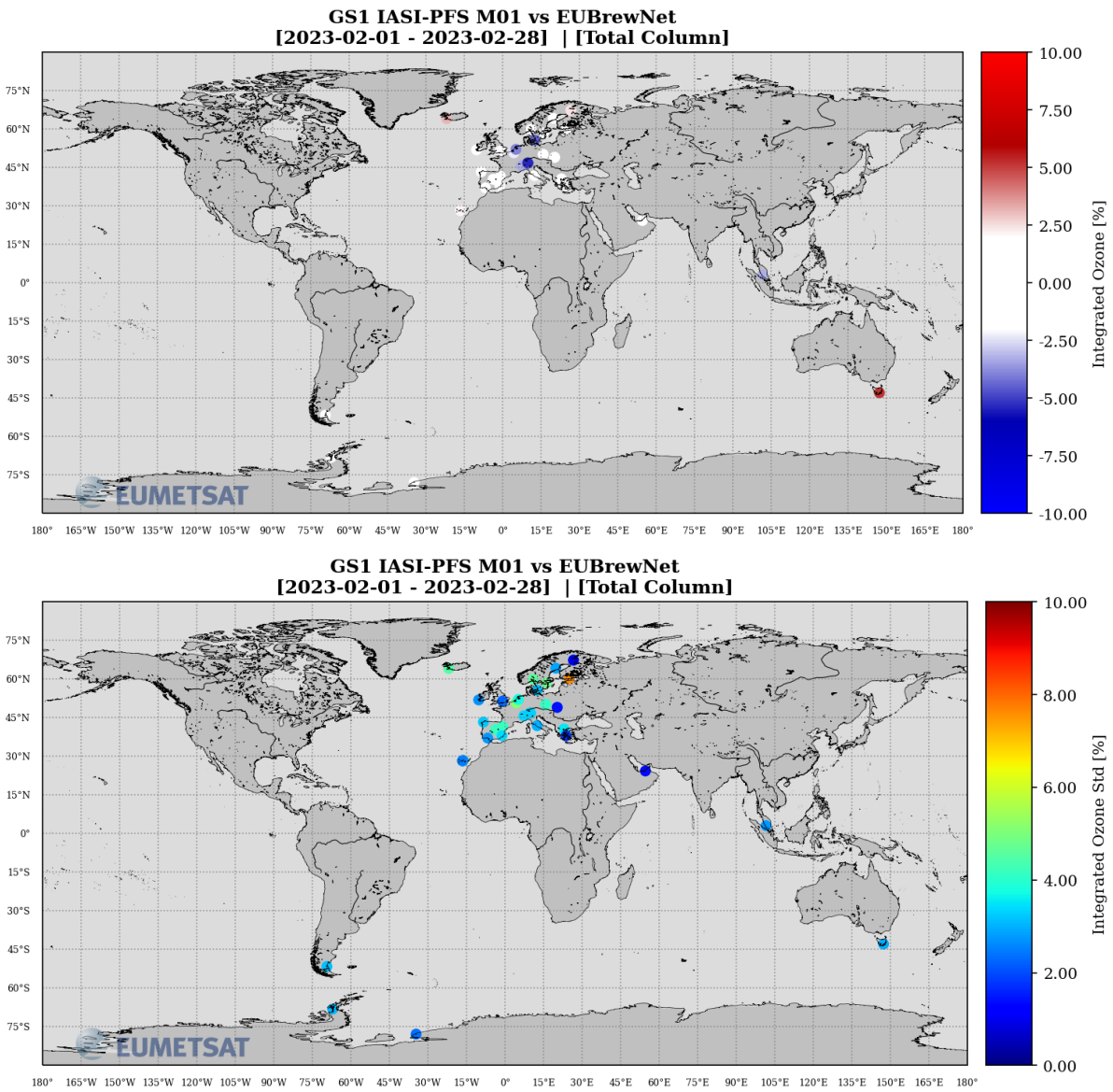


Figure 3.1: Maps of relative integrated Ozone mean (top) differences and standard deviation (bottom) between IASI L2 and EuBrewNet, with M01 IASI L2 from GS1 for 01-28/02/2023