



Balloon- and airborne in-situ measurements for the ENVISAT-validation of H₂O

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Forschungszentrum Jülich
in der Helmholtz-Gemeinschaft



- **Campaigns M55:** Forli' July + October 2002
 Kiruna January-March 2003
 total 24 flights
- **Campaigns balloon:** Aire s/I-Adour October 2002
 Kiruna March 2003
 Kiruna June 2003
- **Instruments:**
 FISH (Fast In Situ Lyman- α -Hygrometer)
 FLASH, CHILD, Lidar



Geophysica correlative measurements

Forli'

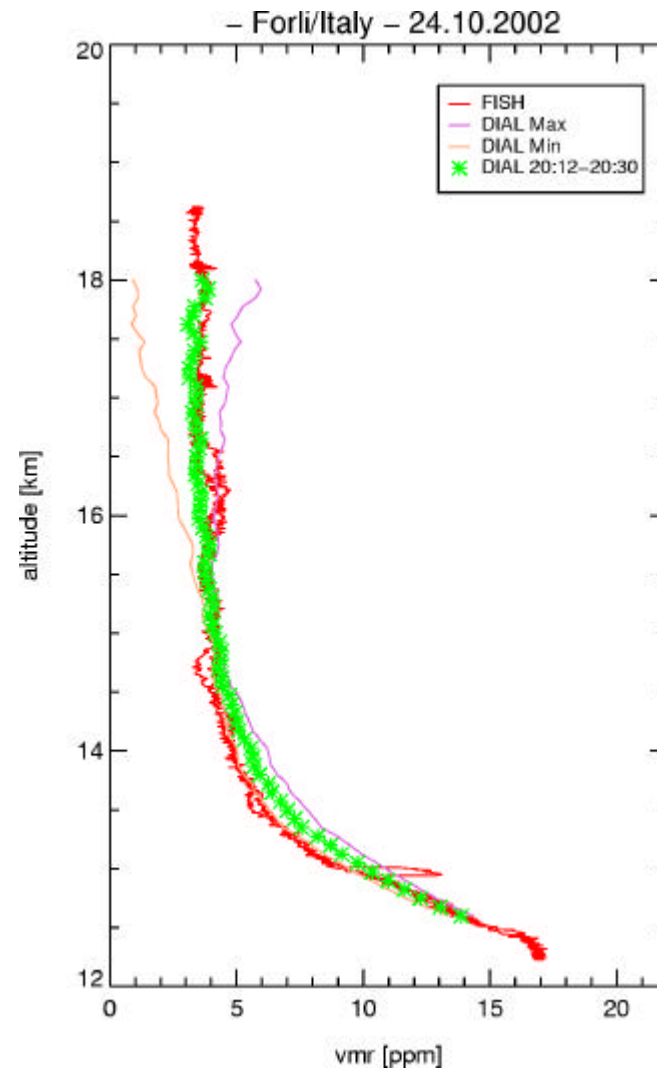
Kiruna

	orbit	FISH	FLASH		orbit	FISH	FLASH
13.07.02	-	X	X	15.01.03	4585	X	X
15.07.02	-		X	19.01.03	4642	X	X
18.07.02	2001		X	23.01.03	4699	X	X
22.07.02	2049	X	X	26.01.03	4742	X	X
08.10.02	3168	X		30.01.03	4799		X
11.10.02	3211	X	X	02.02.03	4843		X
14.10.02	3254	X	X	06.02.03	4906	X	X
17.10.02	3297	X	X	08.02.03	4934	X	X
22.10.02	3368	X	X	09.02.03	4943	X	X
24.10.02	3397	X	X	11.02.03	4971	X	X
28.10.02	3454	X	X	28.02.03	5214	X	X
				02.03.03	5248	X	X
				08.03.03	5329	X	X
				12.03.03	5386	X	X
				16.03.03	5444	X	X

EUPLEX and NERC flights

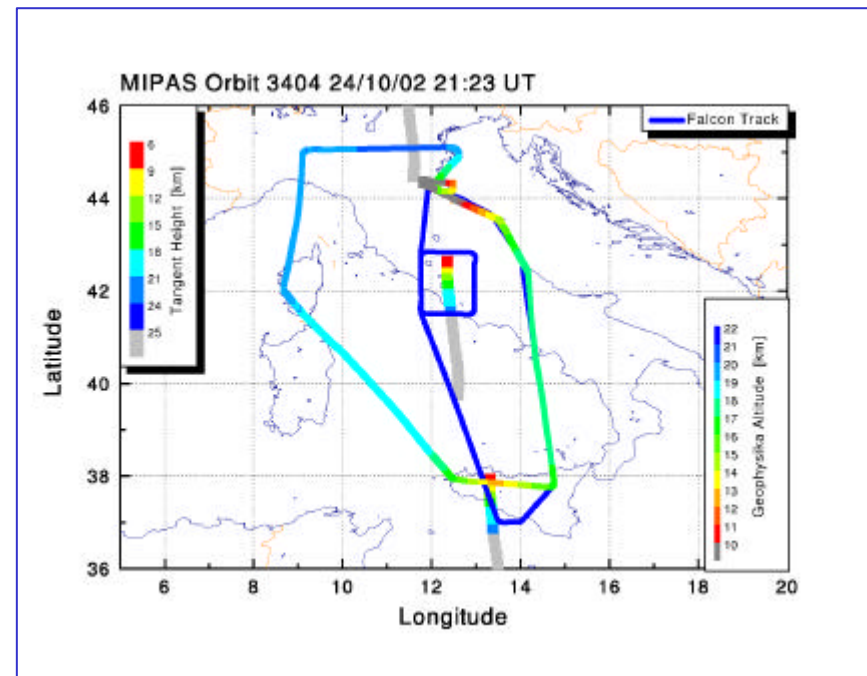
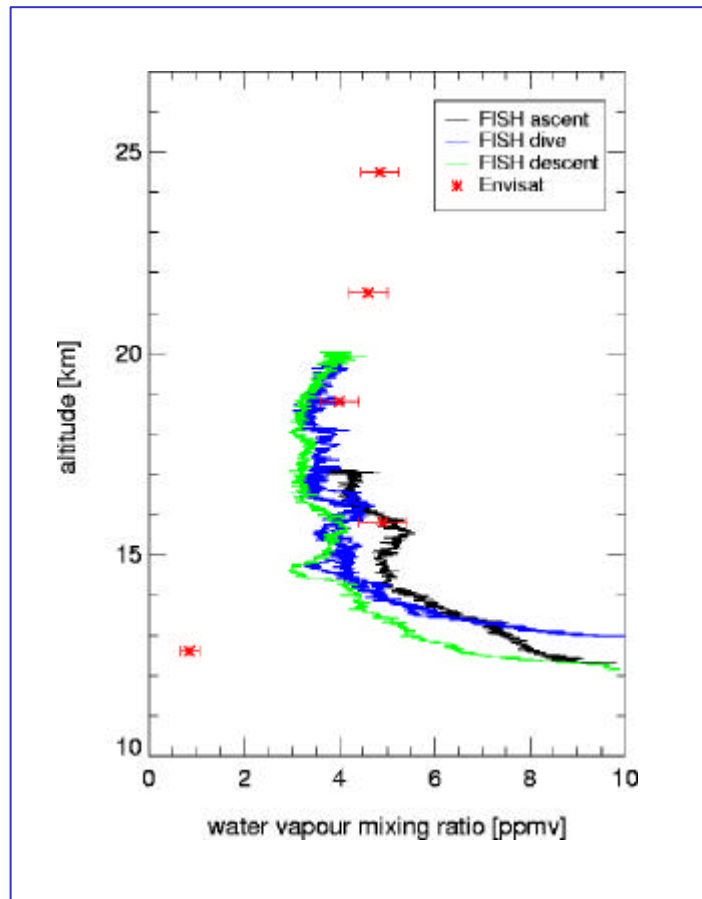


Intercomparison FISH - DIAL



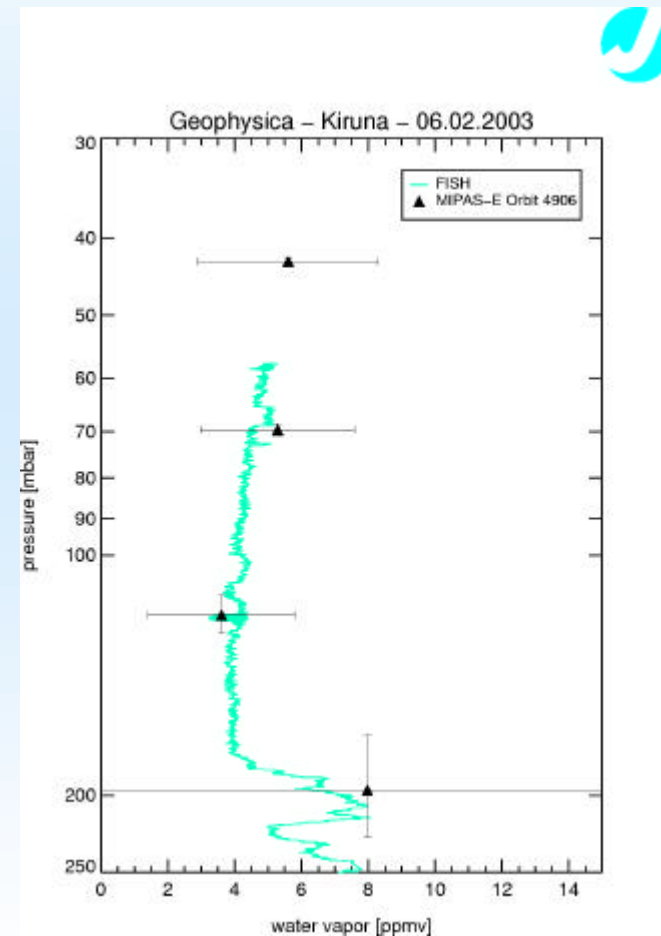
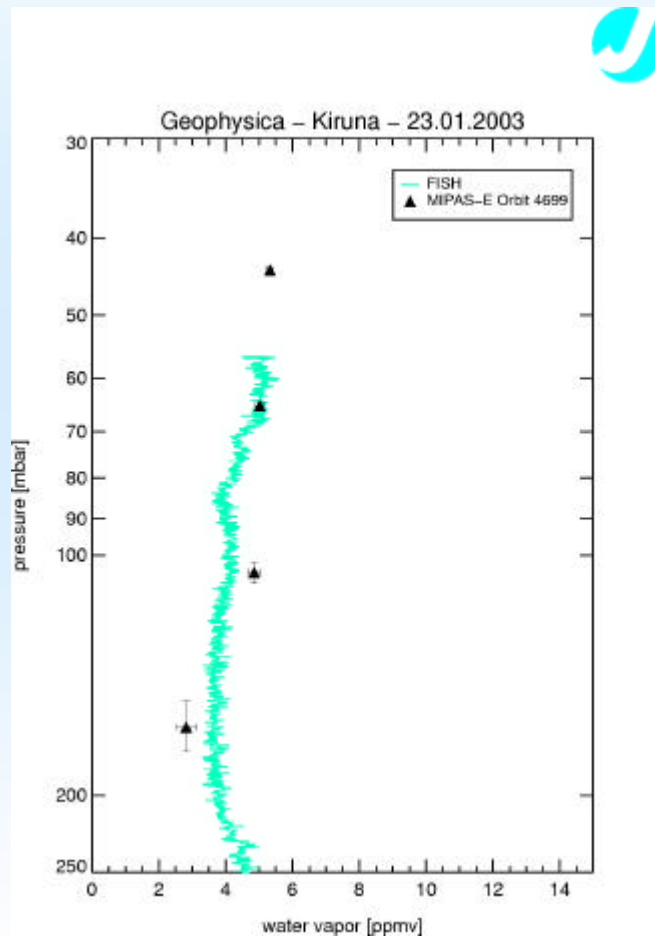
Comparison FISH - MIPAS-E

Geophysica flight 24.10.2002, Forli'



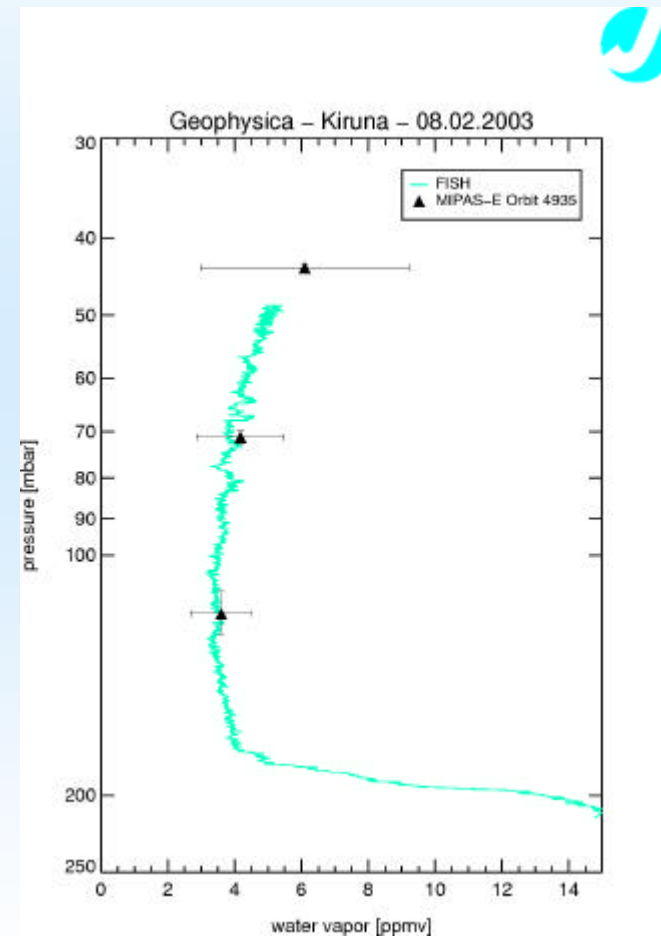
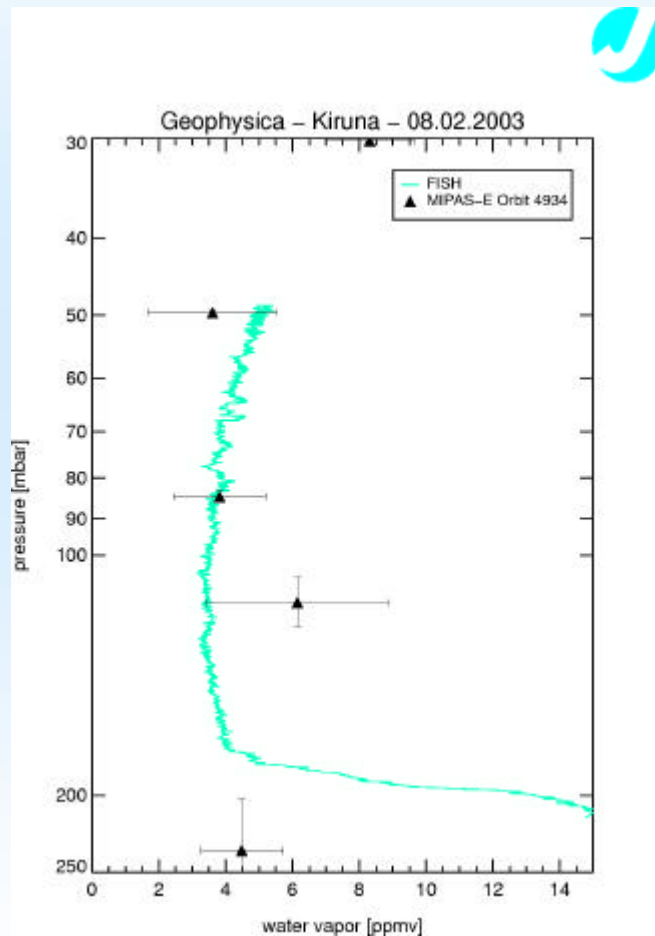
Comparison FISH - MIPAS-E

Geophysica flight



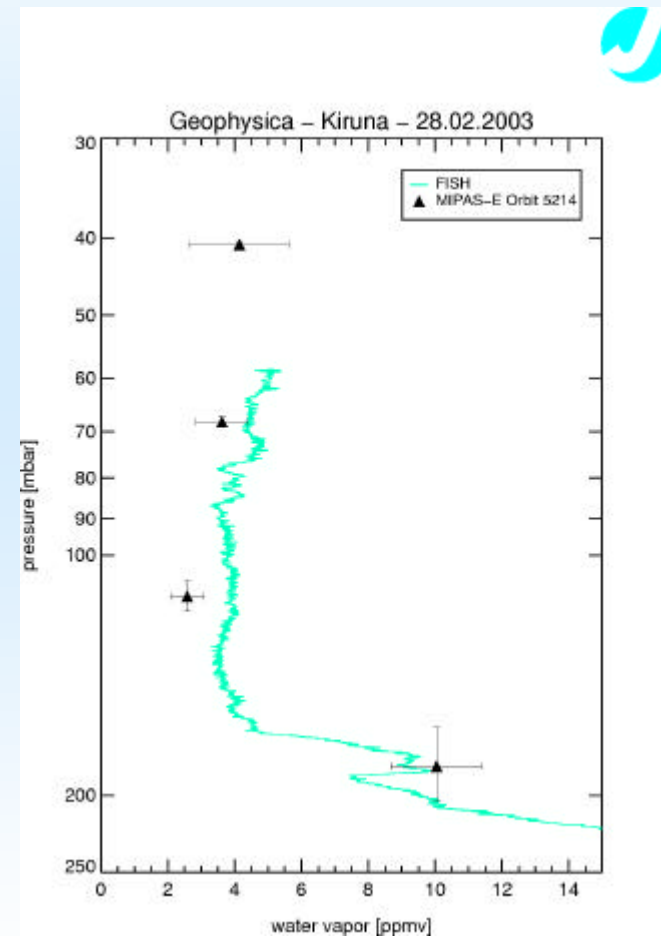
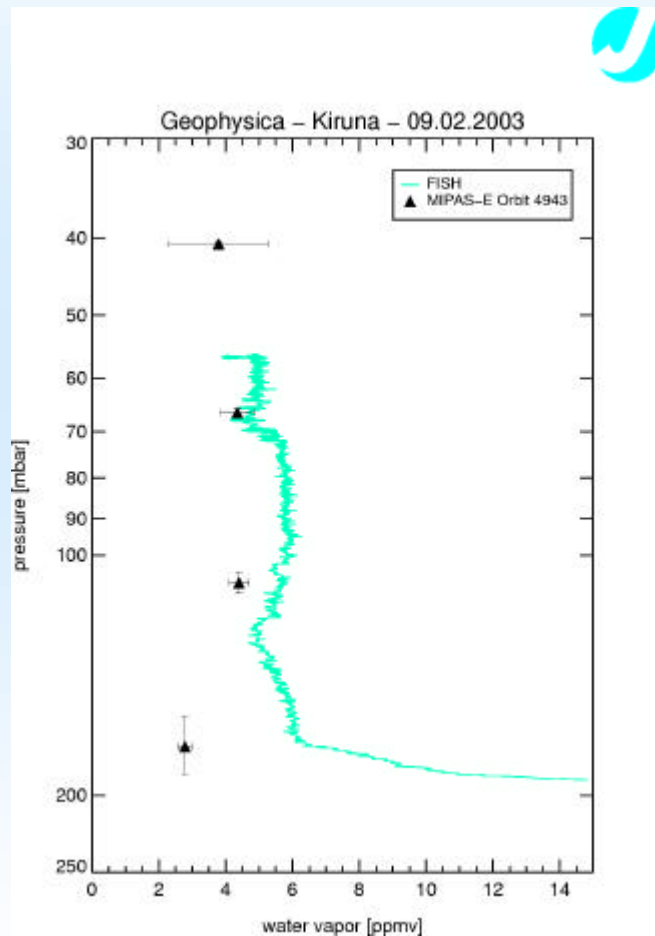
Comparison FISH - MIPAS-E

Geophysica flight



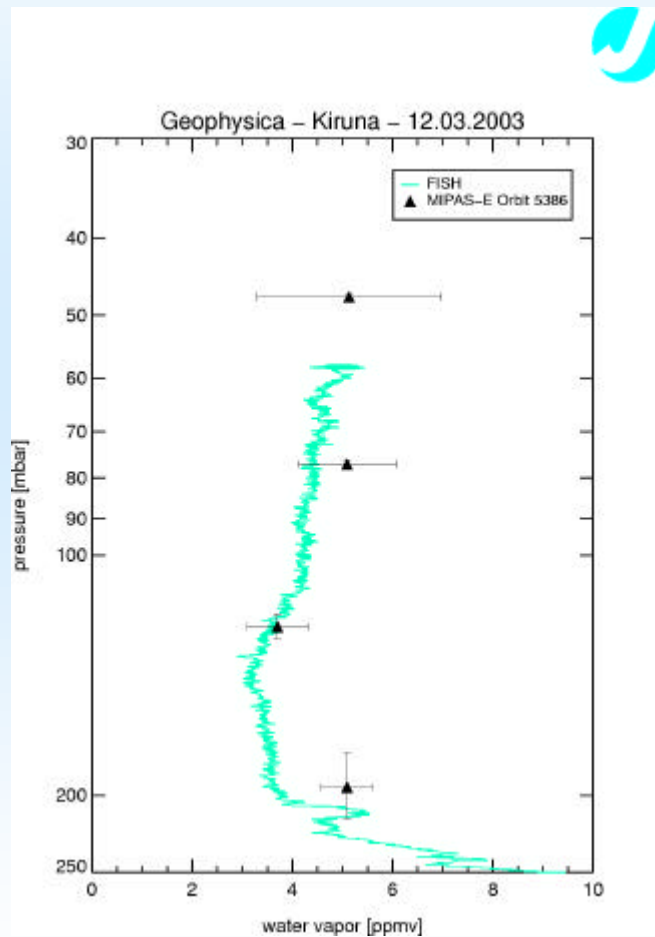
Comparison FISH - MIPAS-E

Geophysica flight

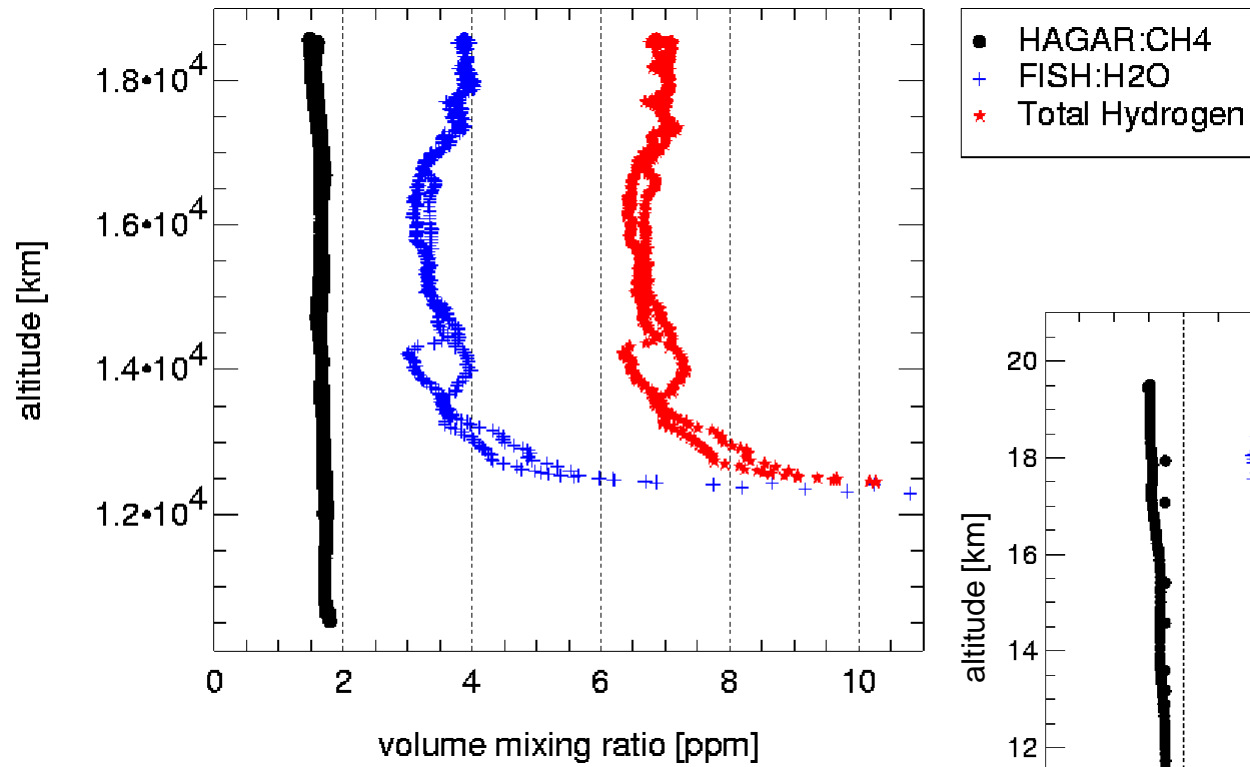


Comparison FISH - MIPAS-E

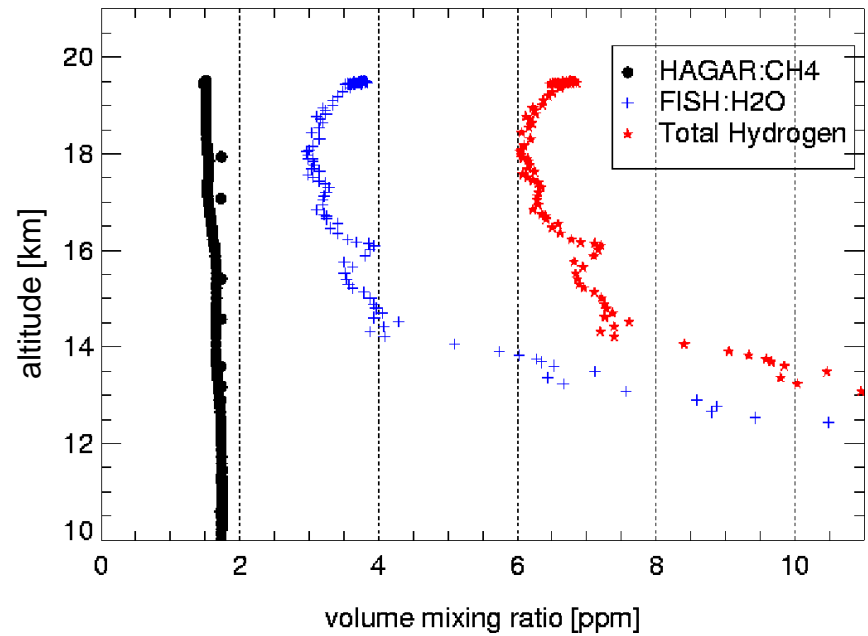
Geophysica flight



11.02.2003, Arctic



22.07.2002, mid-latitudes

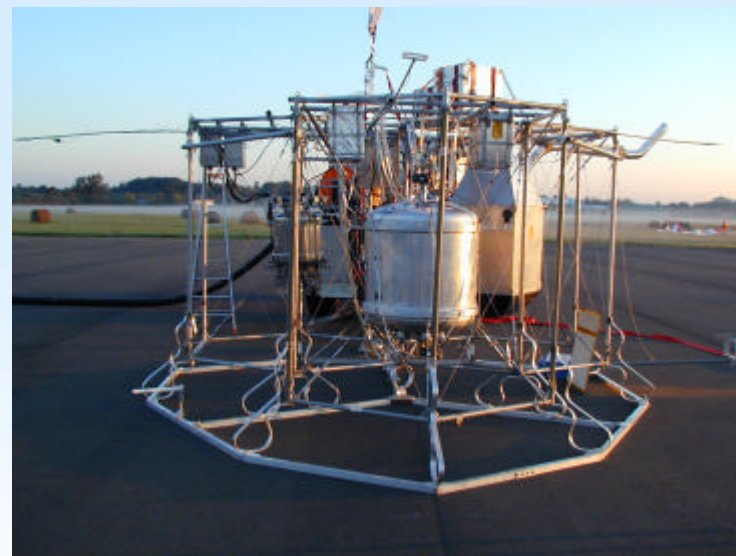


Balloon Campaigns

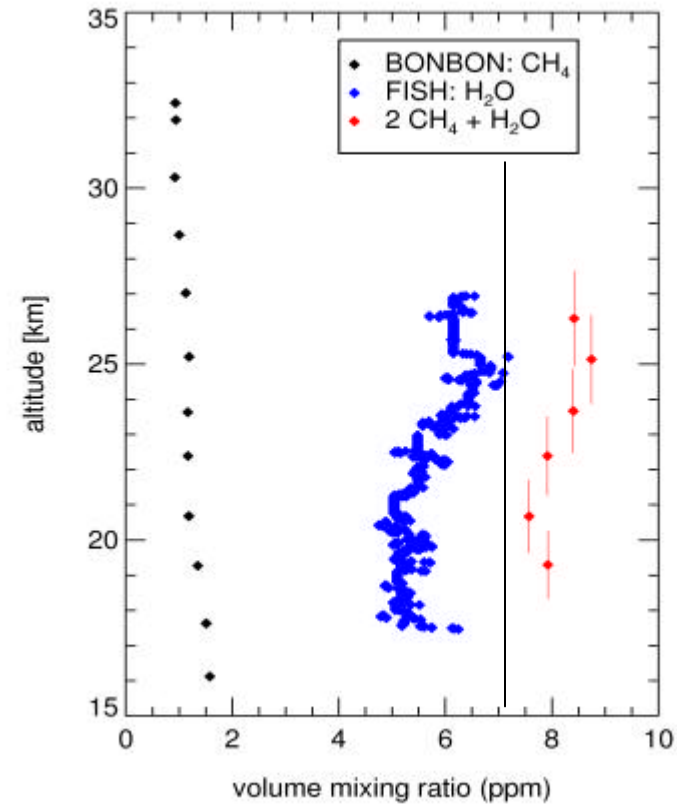
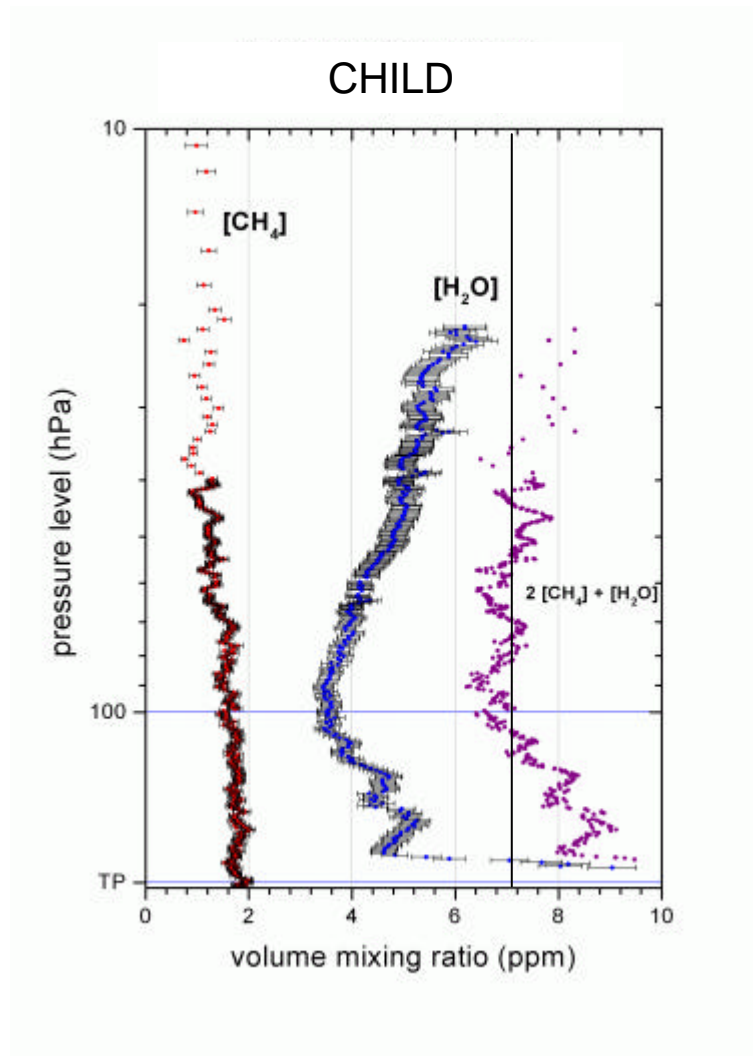
24.09.2002	06:00-12:00	Aire sur l'Adour	Orbit #2968
06.03.2003	06:00-12:00	Kiruna	Orbit #5301
09.06.2003	05:00-11:00	Kiruna	Orbit #6660

Triple

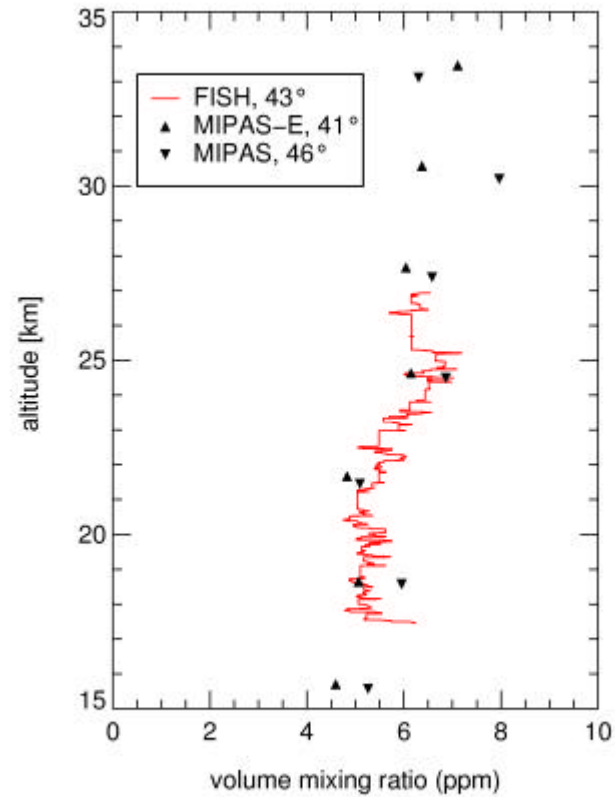
- Cryogenic whole air sampler BONBON
- Lyman-? Hygrometer FISH
- Chemical conversion resonance fluorescence spectrometer BrO/ClO
- Tuneable diode laser spectrometer CHILD

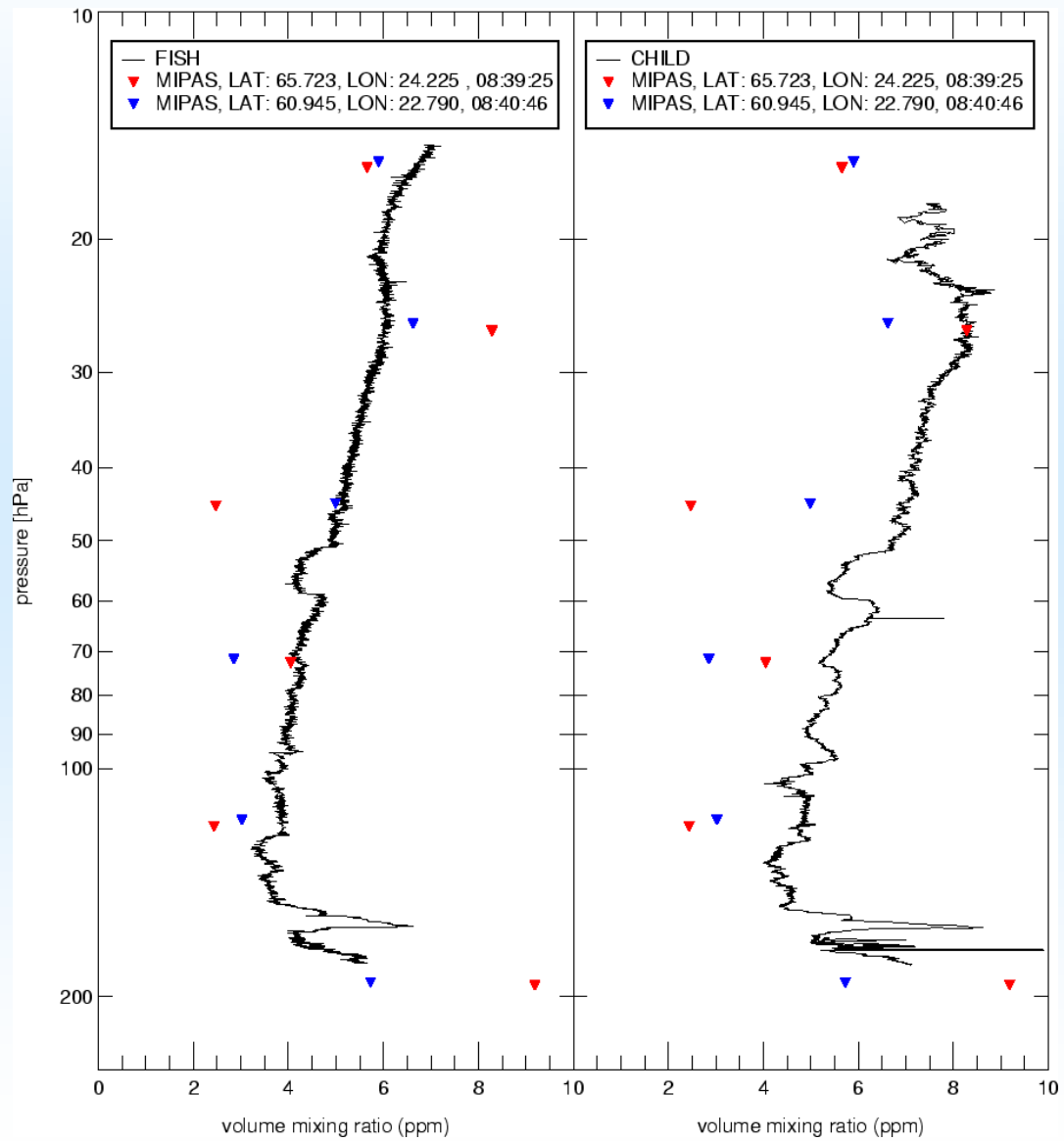


Balloon flight 24.09.2002, ASA



Balloon flight 24.09.2002, ASA





Summary

- 3 balloon flights + 24 Geophysica flights with correlative in-situ measurements of H₂O at mid and high latitudes
- correlative measurements of FISH, FLASH, CHILD and Lidar agree within error bars
- encouraging agreement with first MIPAS-E profiles
data close to tropopause difficult in satellite retrievals
- no SCIAMACHY H₂O data and validation up to now
off-line retrieval of U. Bremen available soon
- future: tropical balloon flight 2004

long-term validation by Geophysica and balloons

