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Space Administration

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California Institute of Technology
Pasadena, California

Quality Flags for Version 4.0

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Summary

- New set of quality flags for version 4.0
 - Flags for three layers of T(p)
 - Quality Flag for cloud cleared radiances
 - Flag for surface skin temperature and emissivities
 - Flags for H₂O, ozone, CO
 - Flag for cloud and OLR
 - Flags for MW only T(p) (strat and trop) and water (vapor and liquid)
- These flags have three possible values
 - Zero means best quality used in statistics and level 3
 - One means good quality used in level 3 processing
 - Only total is good for MW only quality flag for water
 - Surface pressure estimated from topography for P_{surf} Qual Flag
 - Two means poor quality
- The level 3 PGE and statistics package respect these new quality flags
- The RetQAFlag for version 3.6 still exists under slightly different definition
- The retrieval type from version 3.0 still exists



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Version V4.0 Status

- All validation data processing is finished/finishing with V4.0.3
 - All focus days including matchup files
 - retrievals on complete set of existing matchup files (some as early as v2.x)
 - May 1- 16, 2004
 - Dec 25, 2002 - Jan 9, 2003 with HSB
- DAAC Delivery is scheduled later in December
- Additional Items before V4.0 delivery
 - Cij update
 - Validation bit for RetQAFlag
 - Cloud clearing parameter (η) fix



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New Quality Flags for Version 4.0 (1)

Qual_Guess_PSurf	Quality flag for surface surface pressure guess input. The possible values are 0 (good surface pressure guess from valid forecast), 1 (surface pressure guess estimated from topography), and 2 (do not use) Practically always 0. 1 only if retrieval was run without NCEP forecast.
Qual_Cloud_OLR	Overall quality flag for cloud parameters and clear and cloudy OLR Mostly 0 when retrieval type equals 0. Cld/OLR retrieval is attempted even when MW algorithm is rejected, in which case Qual_Cloud_OLR is set to 1. It is rarely 2.
Qual_MW_Only_Temp_Strat	Overall quality flag for MW-Only temperature fields for altitudes above 201 mbar 0 about 95% of all retrievals
Qual_MW_Only_Temp_Tropo	Overall quality flag for MW-Only temperature fields for altitudes at and below 201 mbar, including surface temperature. 0 about 94% of all retrievals
Qual_MW_Only_H2O	Overall quality flag for MW-Only water (both vapor and liquid) fields. The possible values this flag are 0(H2O retrieval fully valid, 86% with HSB), 1(only total precipitable water vapor is valid, 0% with HSB), 2(H2O invalid, 14%with HSB)



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New Quality Flags for Version 4.0 (2)

Qual_H2O	Overall quality flag for water vapor fields Zero 87% over water, 83% over land, never 1
Qual_CO	Quality flag for C O
Qual_O3	Quality flag for ozone Zero 87% over water, 83% over land, never 1
Qual_Temp_Profile_Top	Quality flag for temperature profile at and above Press_mid_top_bndry mbar (currently 200 mb) Zero 88% over water, 86% over land, never 1
Qual_Temp_Profile_Mid	Quality flag for temperature profile between Press_mid_top_bndry mbar and Press_bot_mid_bndry mbar (currently 3 km above surface) Zero 58% over water, 68% over land, never 1
Qual_Temp_Profile_Bot	Quality flag for temperature profile below Press_bot_mid_bndry mbar, including surface air temperature Zero 45%, one 13% over water Zero 20%, one 47% over land
Qual_Surf	Overall quality flag for surface fields including surface temperature, emissivity, and reflectivity 0 or 1 about 20% of all retrievals over water. 1 about 67% over land

- Possible values: 0 (Highest quality), 1(good quality, use in level 3, but not in statistics), 2(poor quality)



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RetQAFlag for Version 4.0

Bits 13-15	spare, set to zero
Bit 14	Ozone retrieval rejected(Qual_Ozone>0)
Bit 13	Water Vapor Retrieval rejected (Qual_H2O > 0)
Bit 12(value 4096)	Top part of temperature profile quality check failed or not attempted. (Qual_Temp_Profile_Top > 0)
Bit 11(value 2048)	Middle part of temperature profile quality check failed or not attempted. (Qual_Temp_Profile_Mid > 0)
Bit 10(value 1024)	Bottom part of temperature profile quality check failed or not attempted. (Qual_Temp_Profile_Bot > 0)
Bit 9(value 512)	Surface retrieval is suspect or rejected. (Qual_Surf > 0)
Bit 8 (value 256)	This record type not yet validated
Bits 5-7	Spare, set to zero
Bit 5	Cloud/OLR rejected or not attempted
Bit 4(value 16)	Final retrieval rejected or not attempted
Bit 3(value 8)	Final Cloud Clearing rejected or not attempted
Bit 2(value 4)	Regression First Guess rejected or not attempted
Bit 1(value 2)	Initial Cloud Clearing rejected or not attempted ;
Bit 0(value 1)	MW retrieval rejected or not attempted

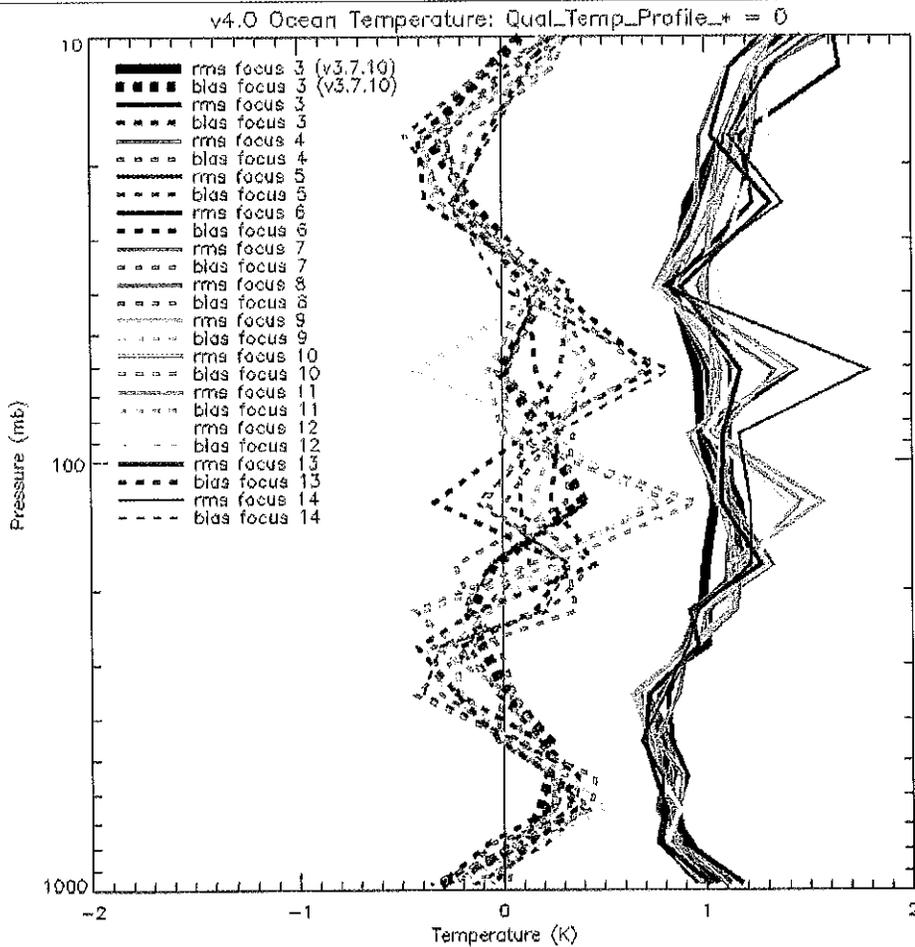


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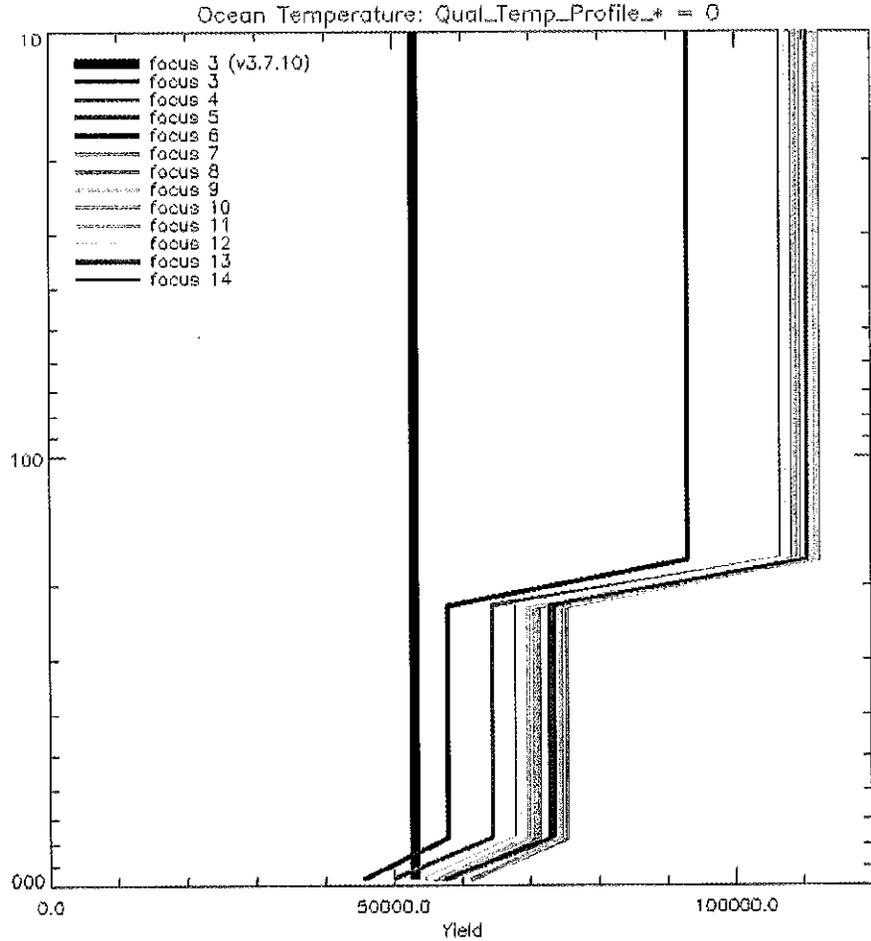
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Temperature Statistics and Yields

V4.0 on all focus days and V3.7 on Focus3



Temperature Bias and RMS wrt ECMWF



Number of Accepted Retrievals

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• Focus6(Jan 3 2003) is not full

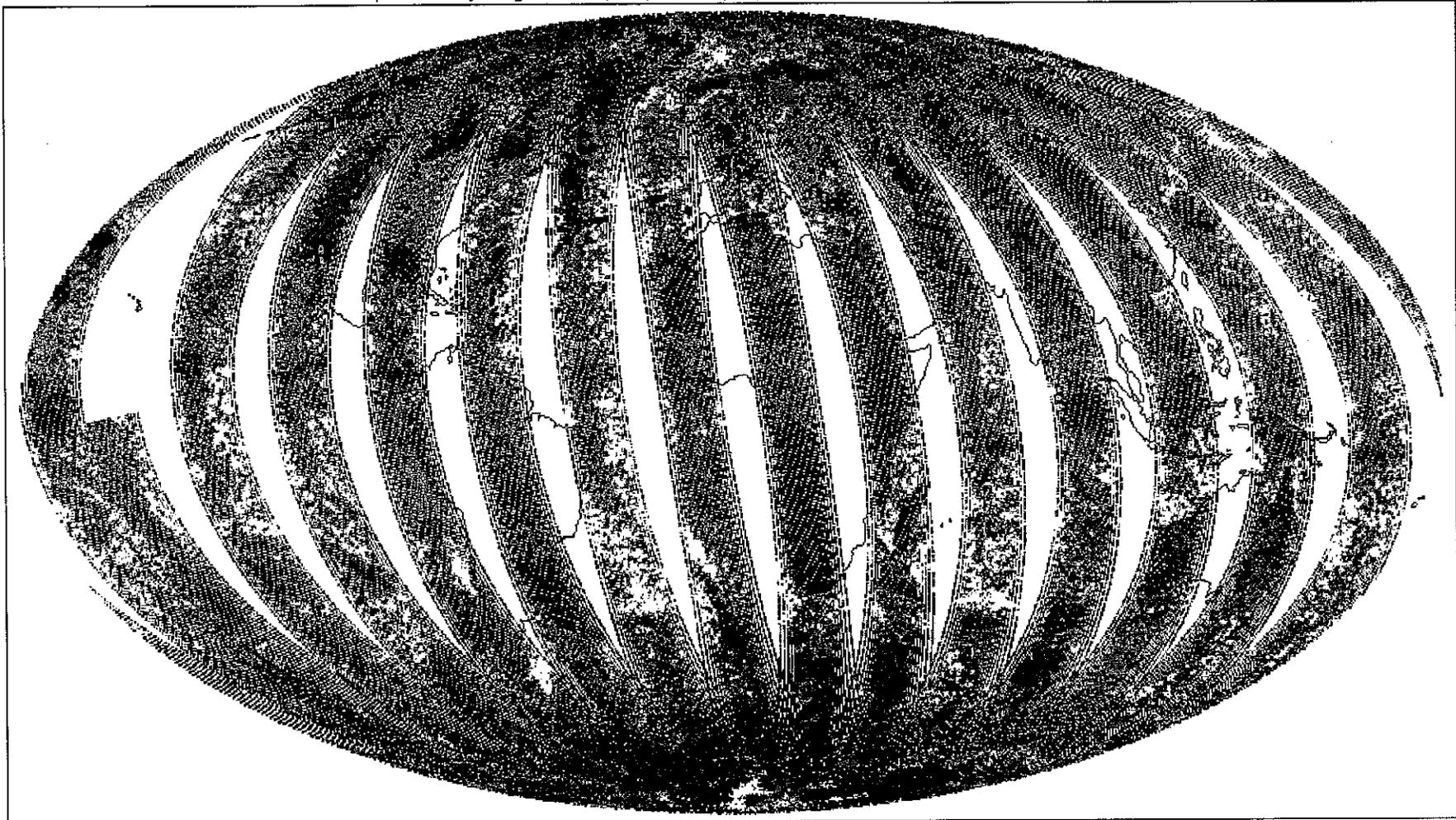


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Map of Temperature Quality Flags Ascending Orbits, Sept 6, 2002

Map of Quality Flags: Yellow(Surf), Green(Bot), Blue(Mid), Red(Top), Black(RType>0)



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• Only zero value is checked

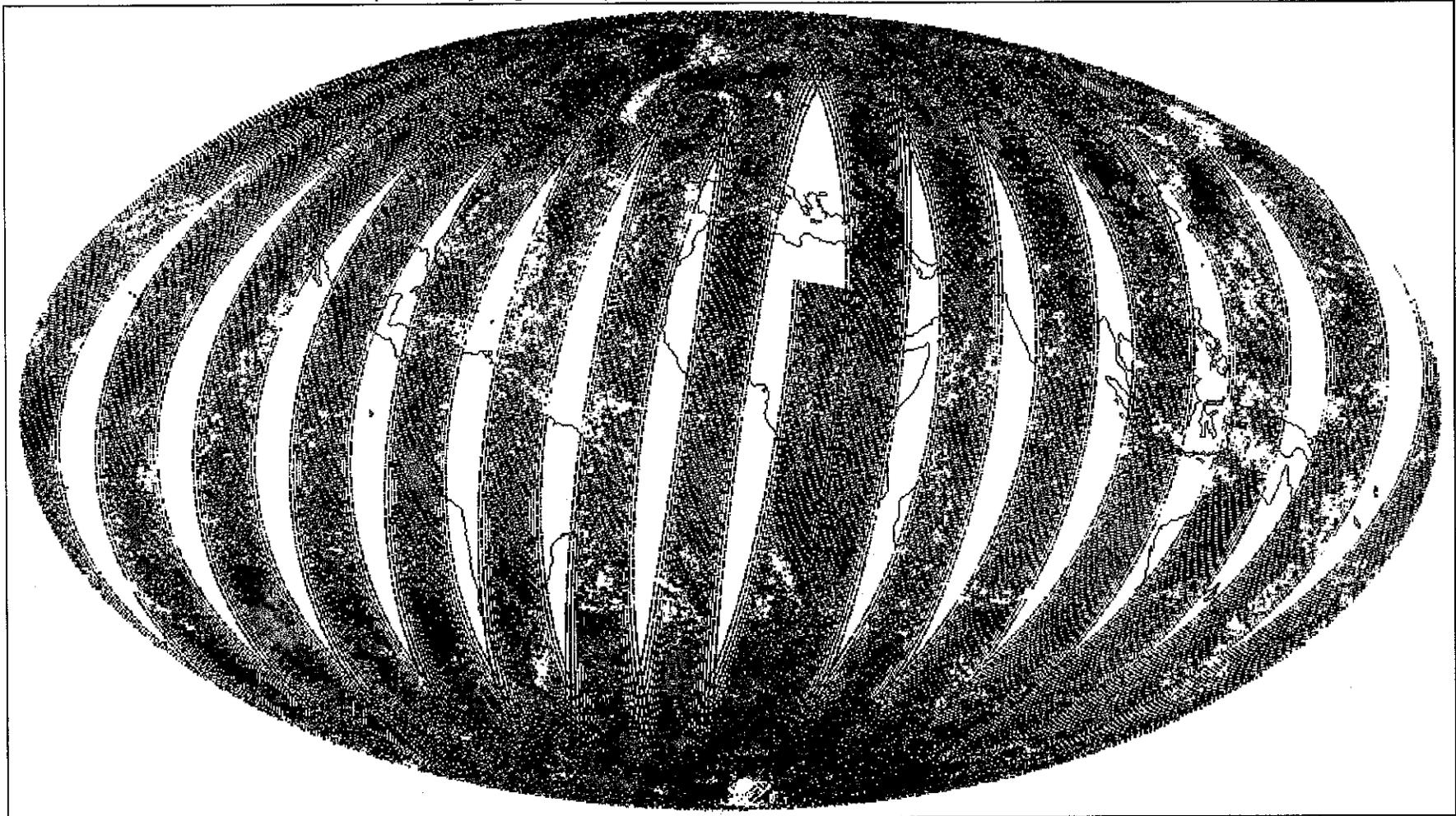


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Map of Temperature Quality Flags Descending Orbits, Sept 6, 2002

Map of Quality Flags: Yellow{Surf}, Green{Bot}, Blue{Mid}, Red{Top}, Black{RType>0}



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• Only zero value is checked

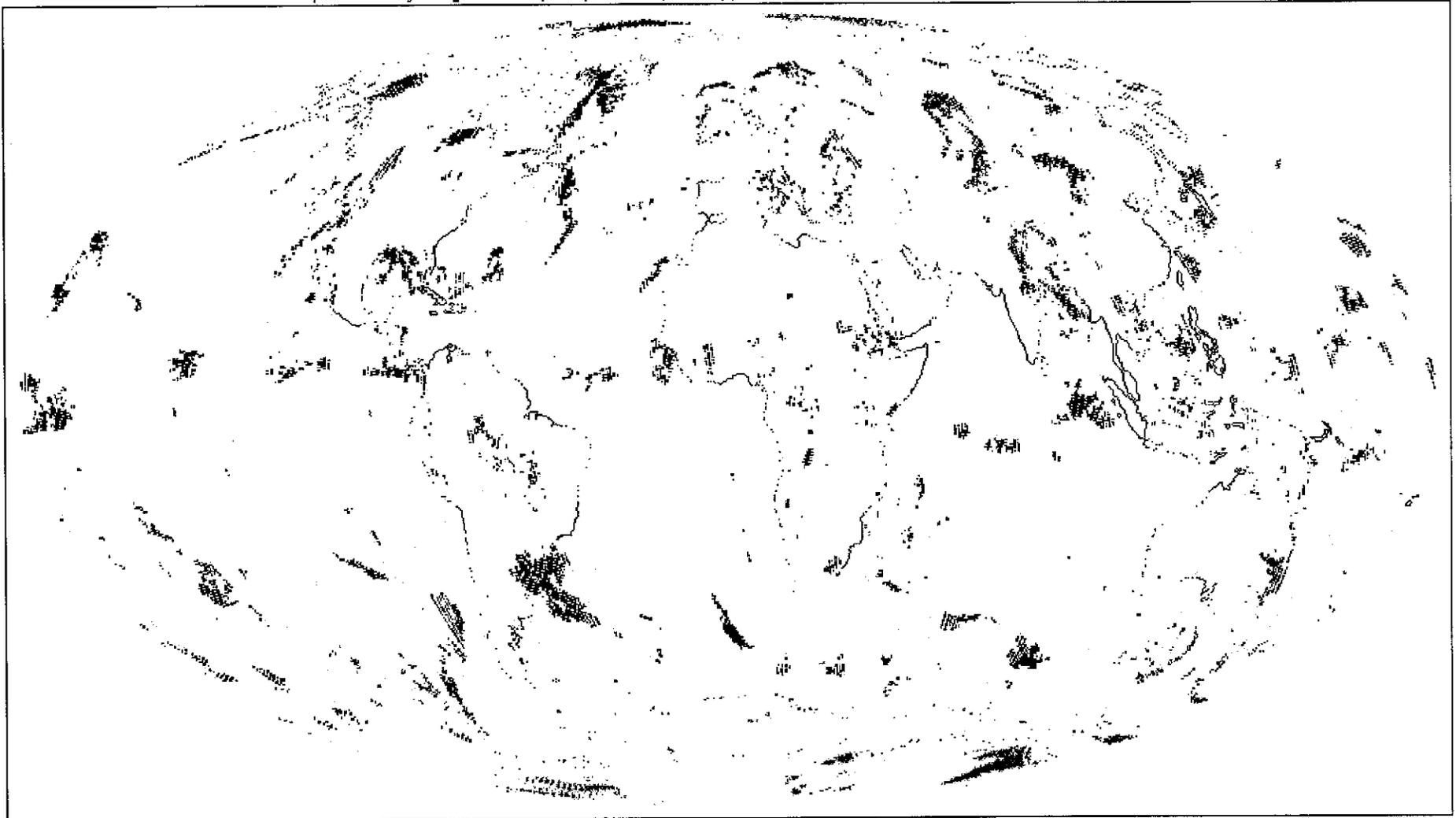


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MW Only Quality Flags with HSB

Map of Quality Flags: Yellow(MWQ), Green(MWTrop), Blue(MWStrat), Red(RType), Black(ClId/OLR>0)



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MW Only Quality Flags without HSB

Map of Quality Flags: Yellow(All), Green(MMWQWTrop), Blue(MWStrat), Red(RType), Black(Cld/OLR>0)



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• MW only total precipitable water vapor is valid only over ocean without HSB¹¹



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Summary

- One needs to understand and use the flags correctly
- Casual users can use RetQAFlag for quality control
- Retrieval Type should not be used as quality indicator