

MODIS B26 Performance

Influence of B5 (1.2 μ m) on B26 (1.38 μ m)

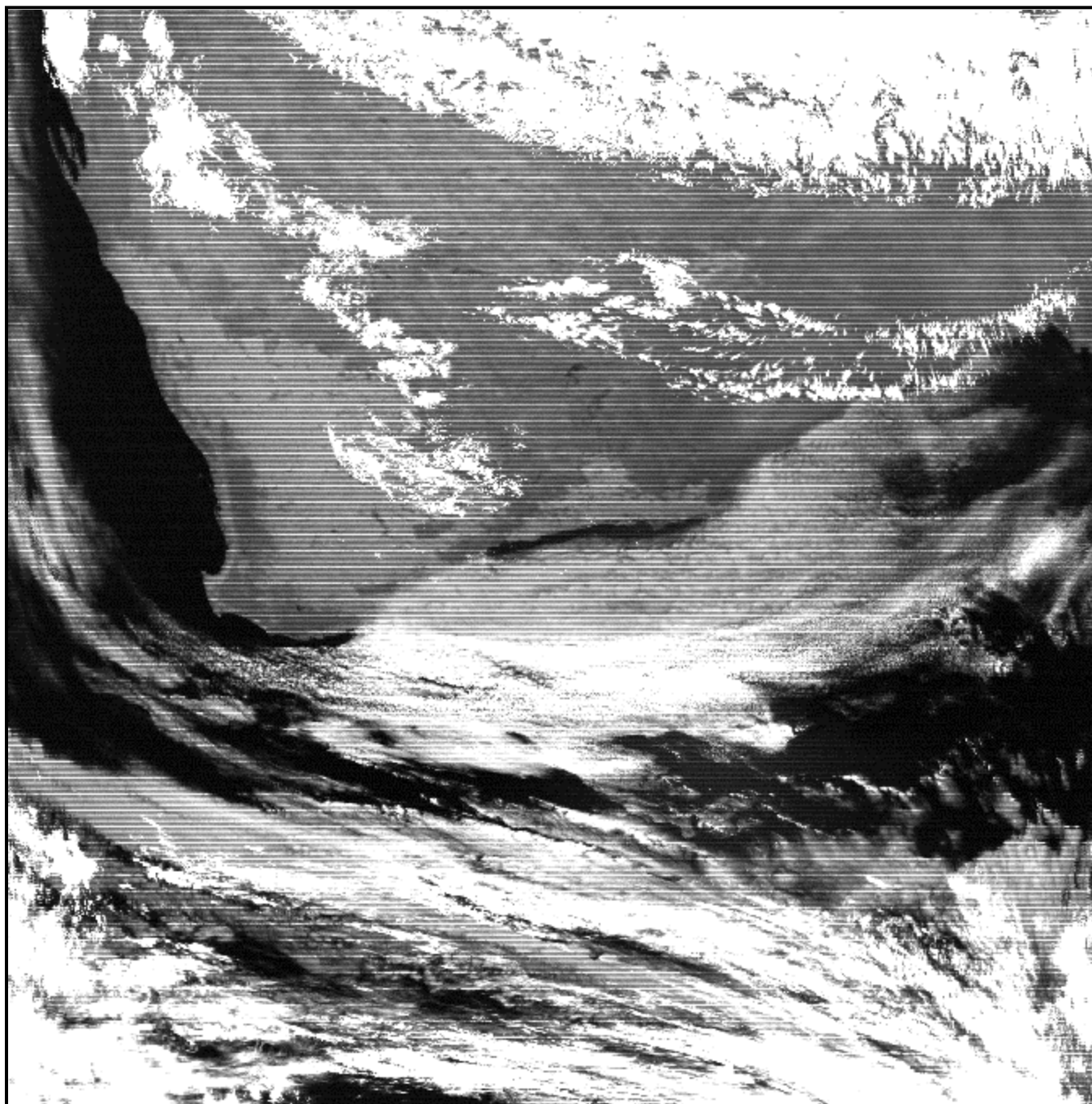
Chris Moeller

U. Wisconsin

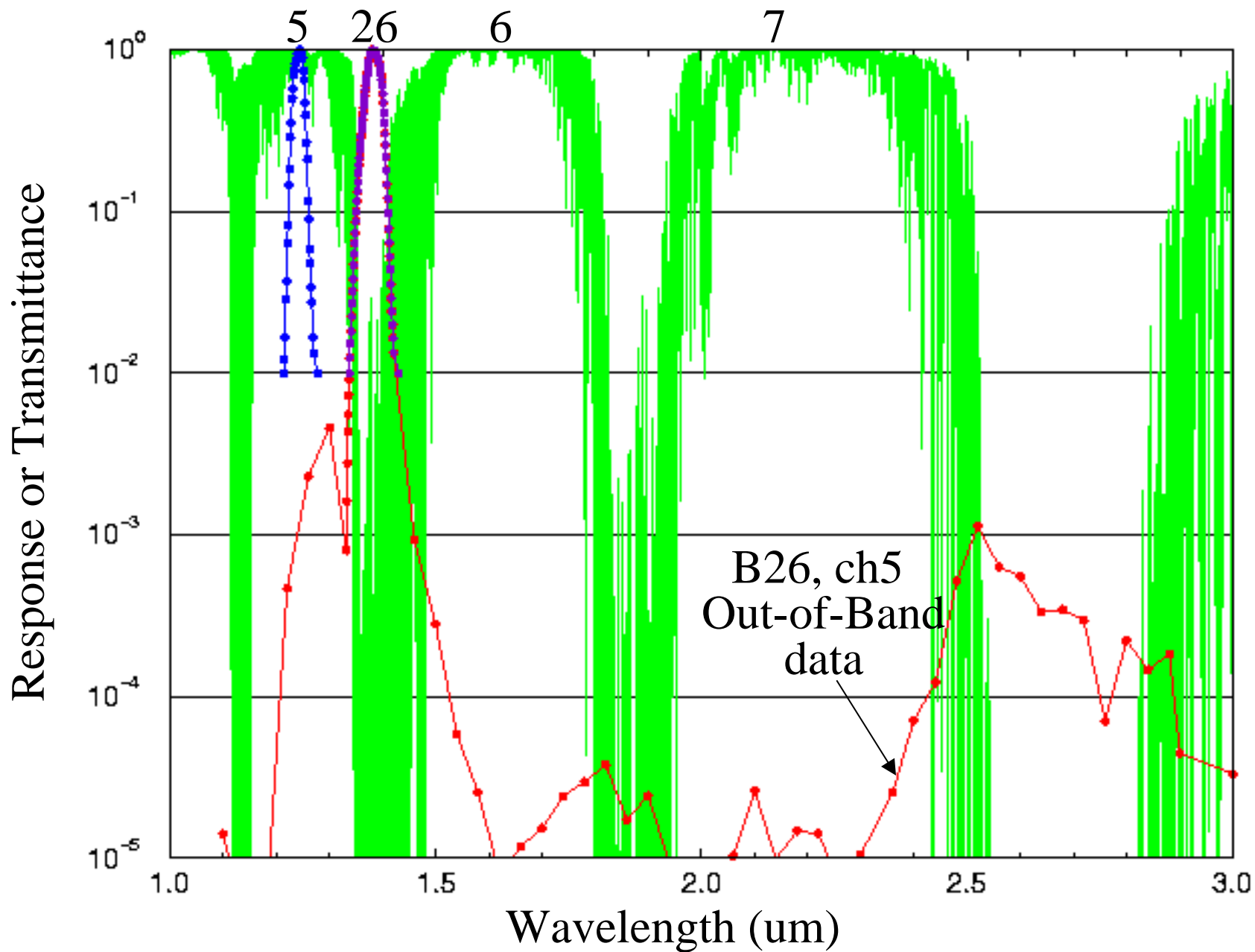
Presentation to MODIS Atmos. Group

12/17/01

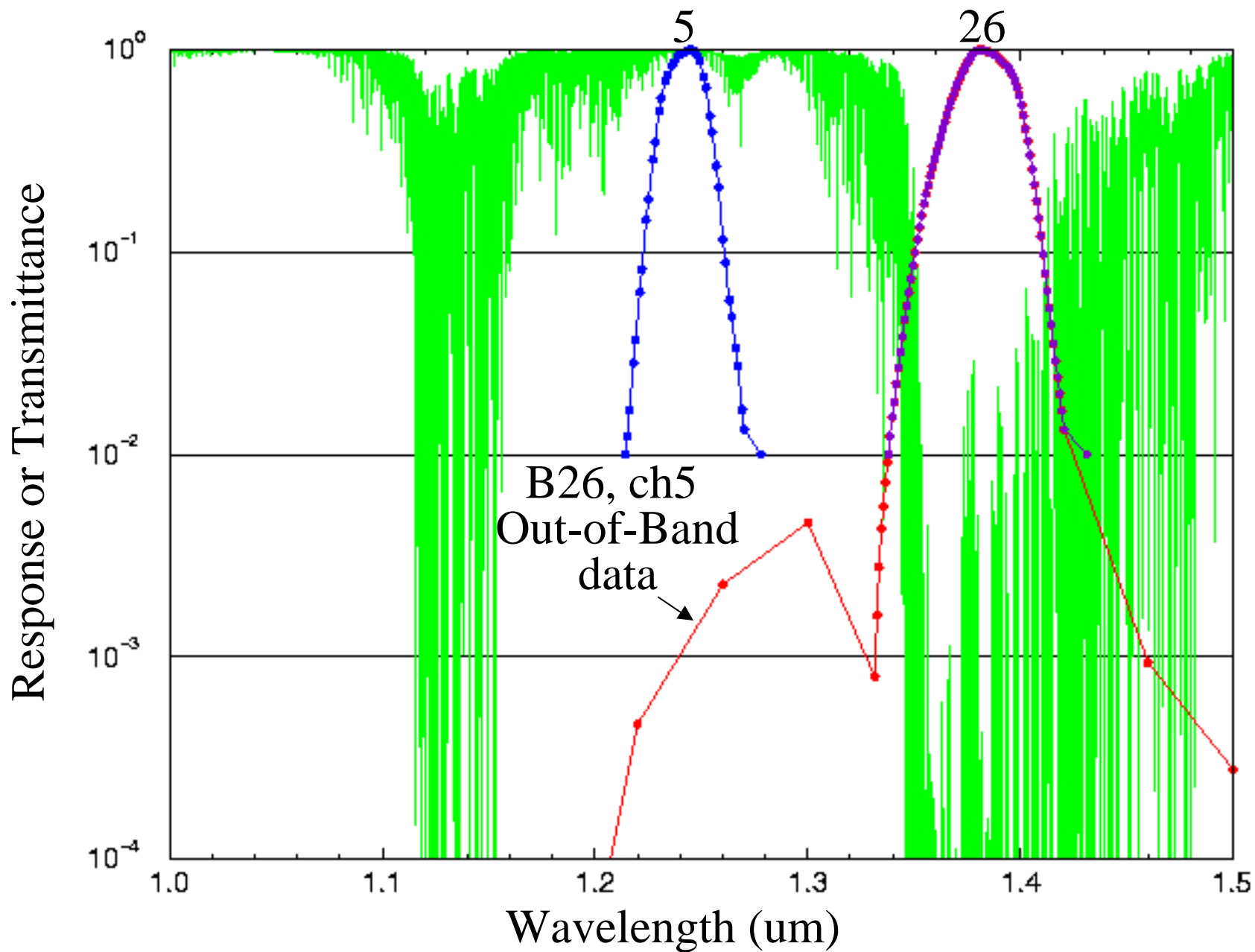
Dec 8, 2000
0215 UTC
Band 26
Uncorrected



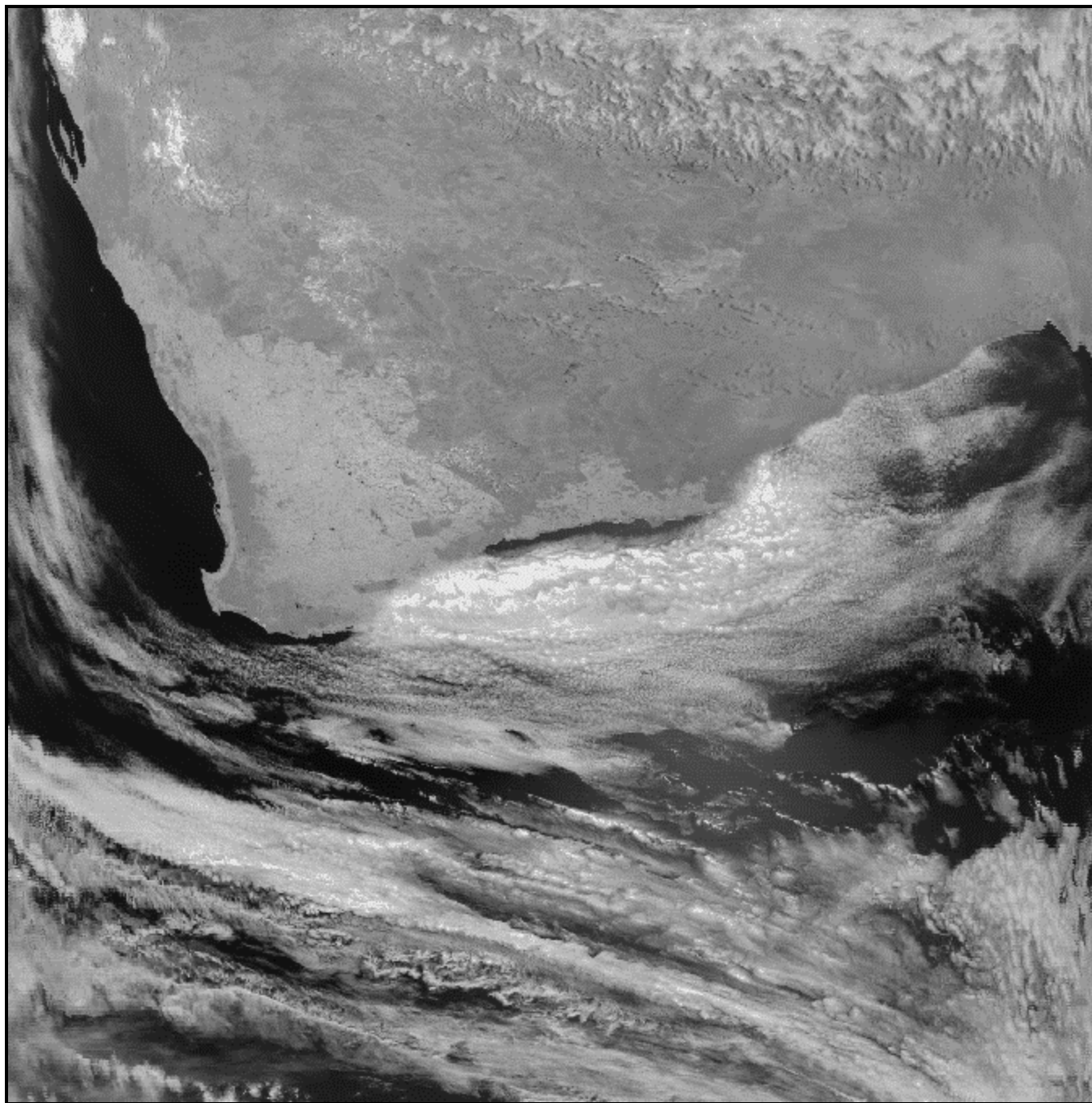
The OOB feature near B5 is the largest in the SWIR region.



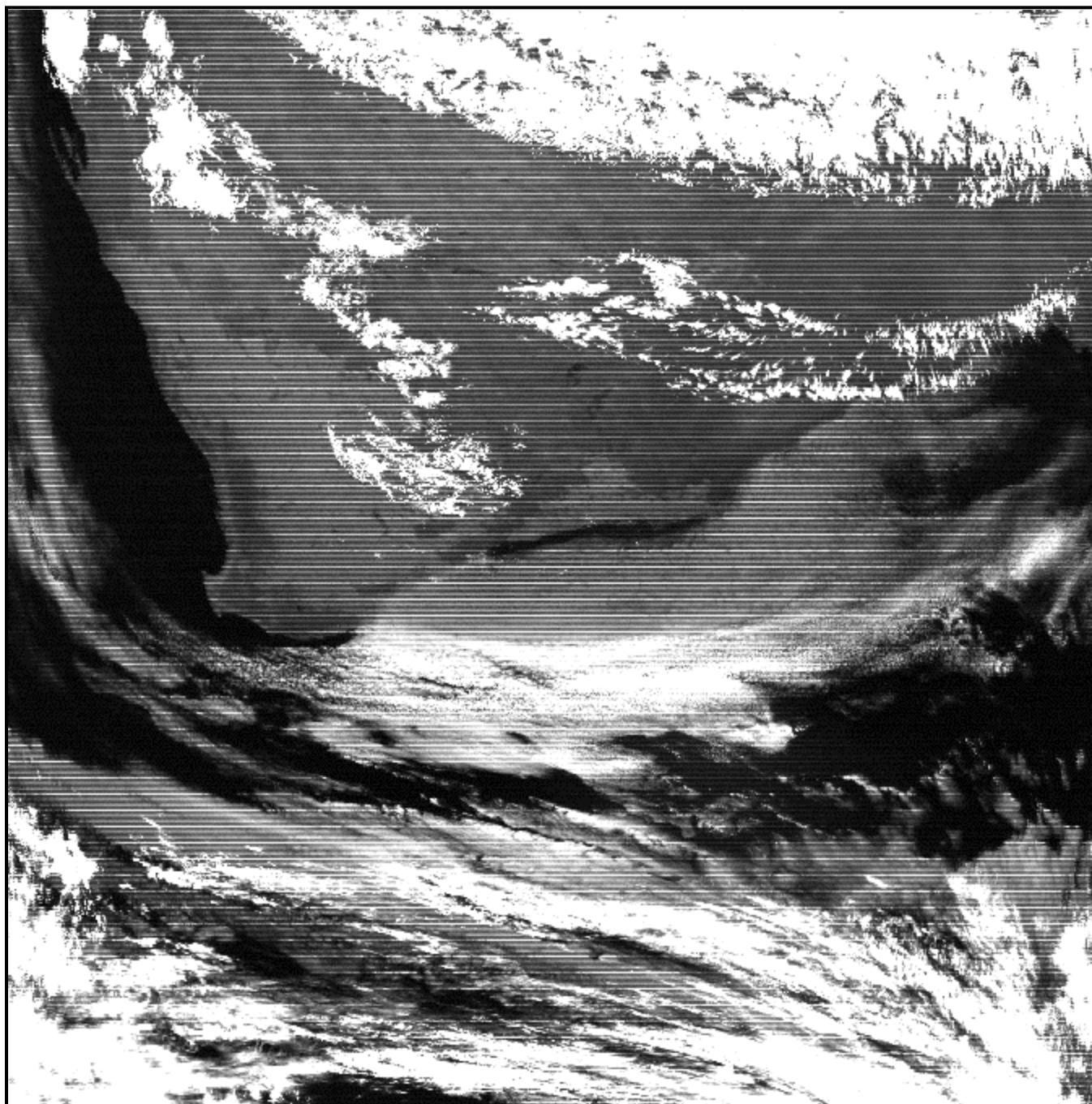
An OOB feature near B5 may be contributing to B26 signal.



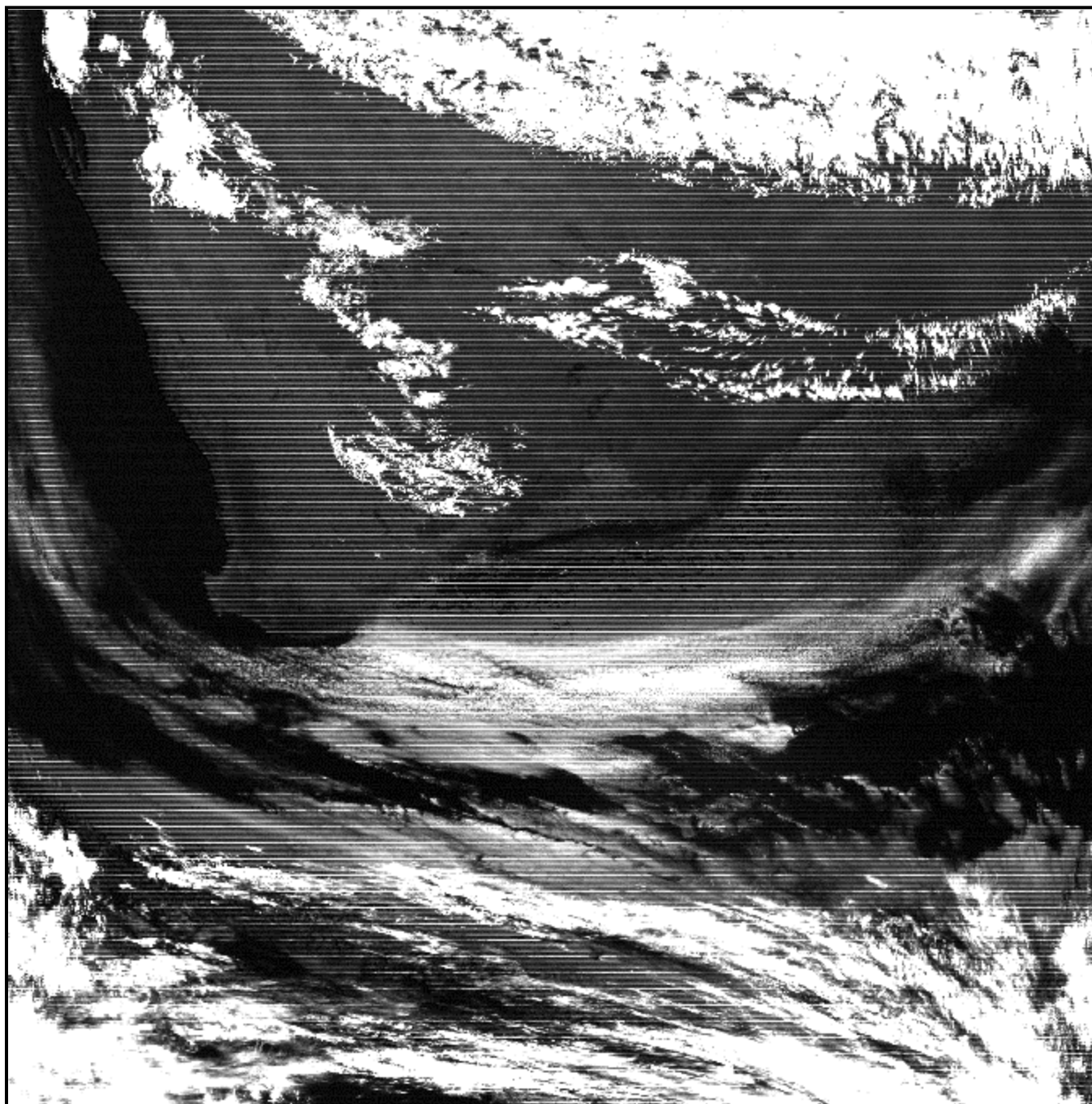
Dec 8, 2000
0215 UTC
Band 5
W. Australia



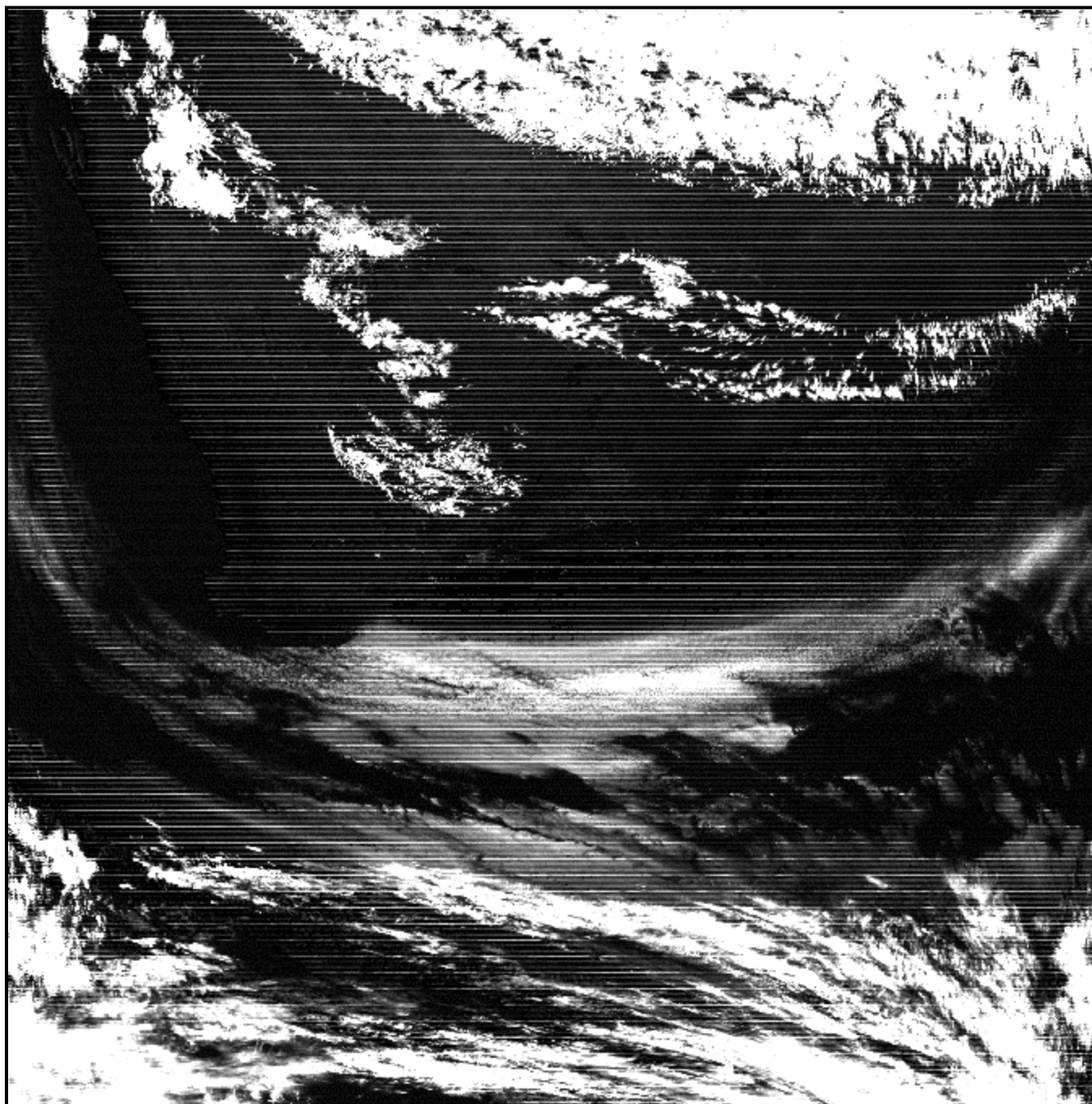
Dec 8, 2000
0215 UTC
Band 26
.005 influence
removed



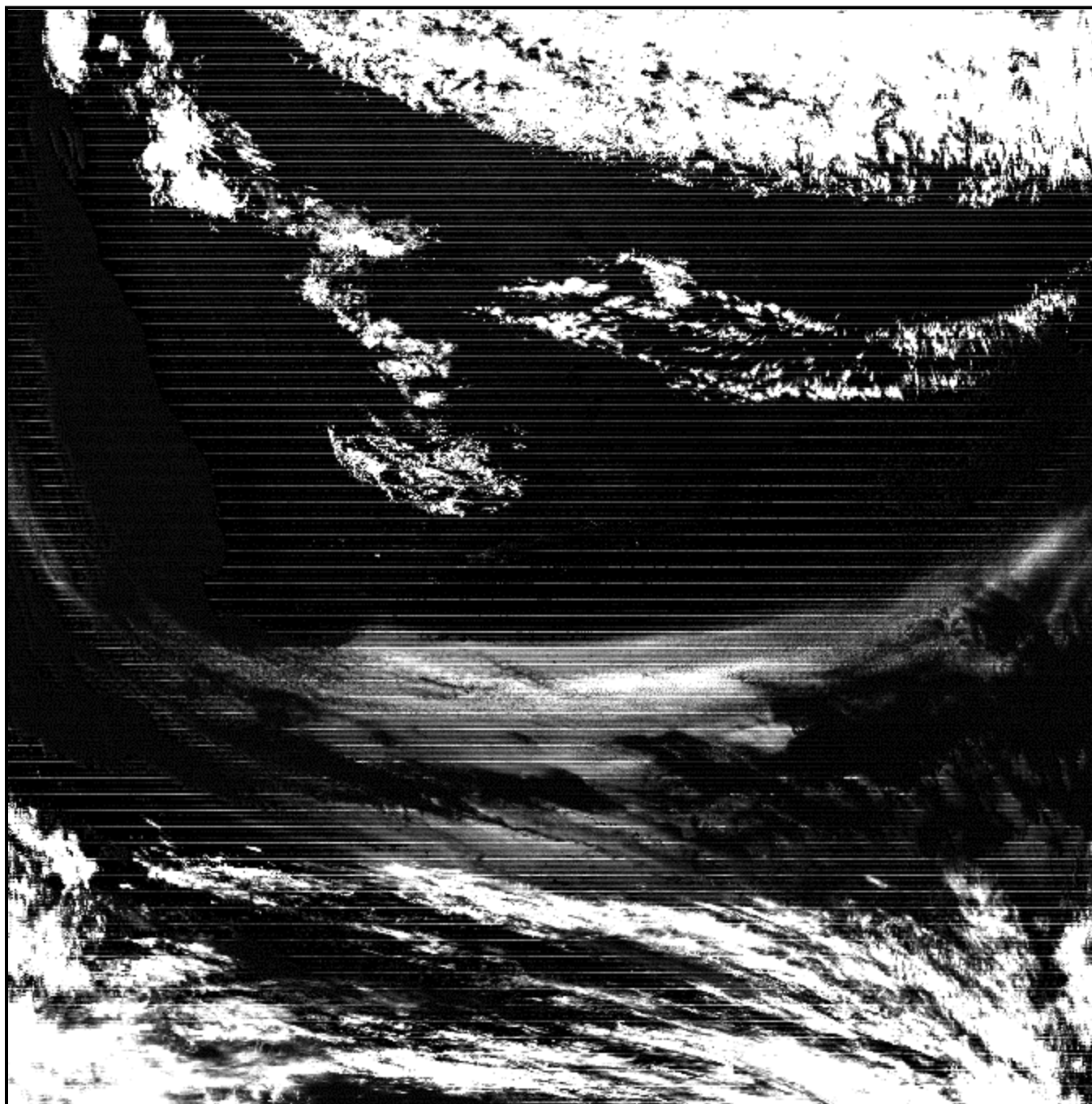
Dec 8, 2000
0215 UTC
Band 26
.010 influence
removed



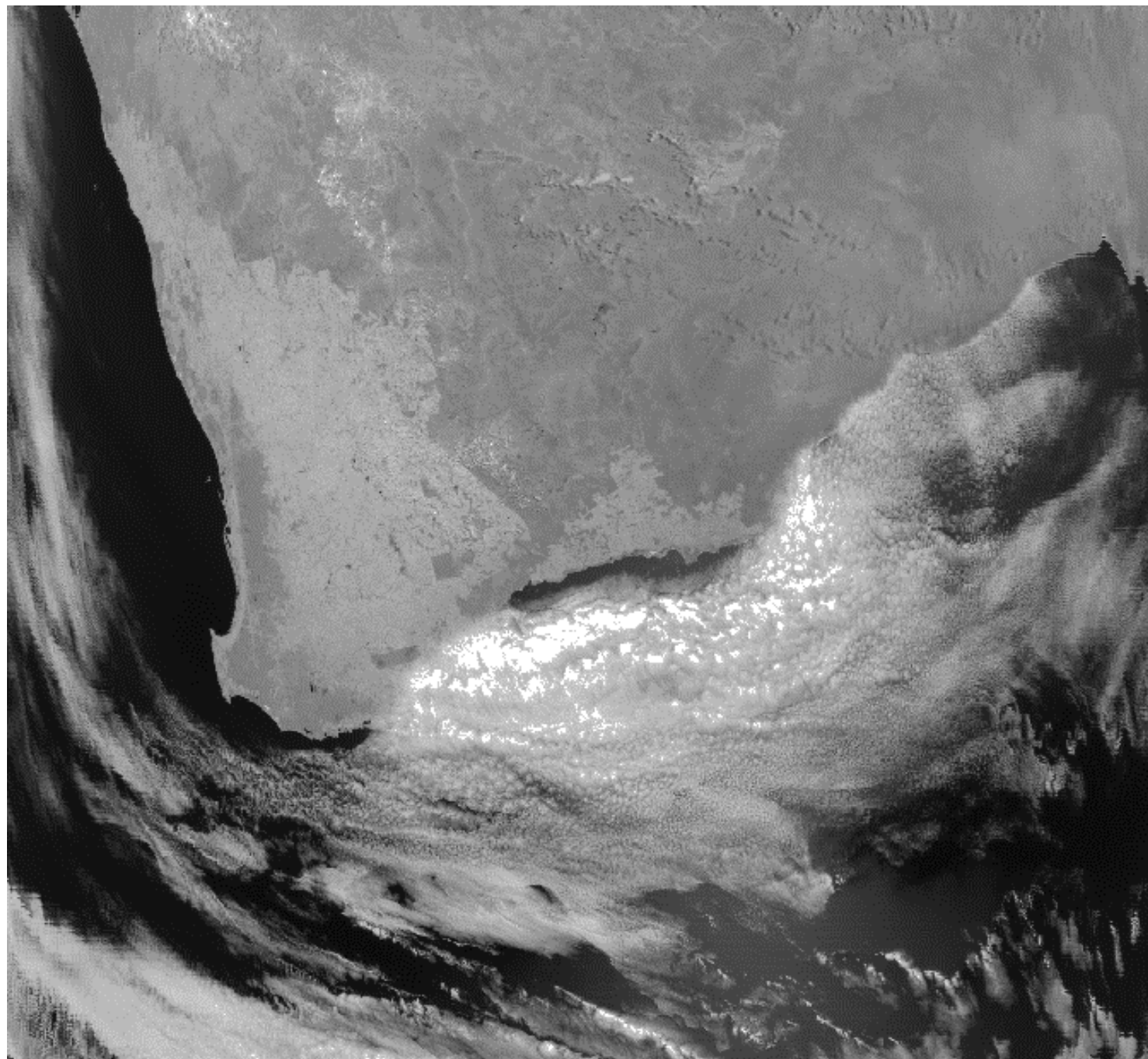
Dec 8, 2000
0215 UTC
Band 26
.015 influence
removed



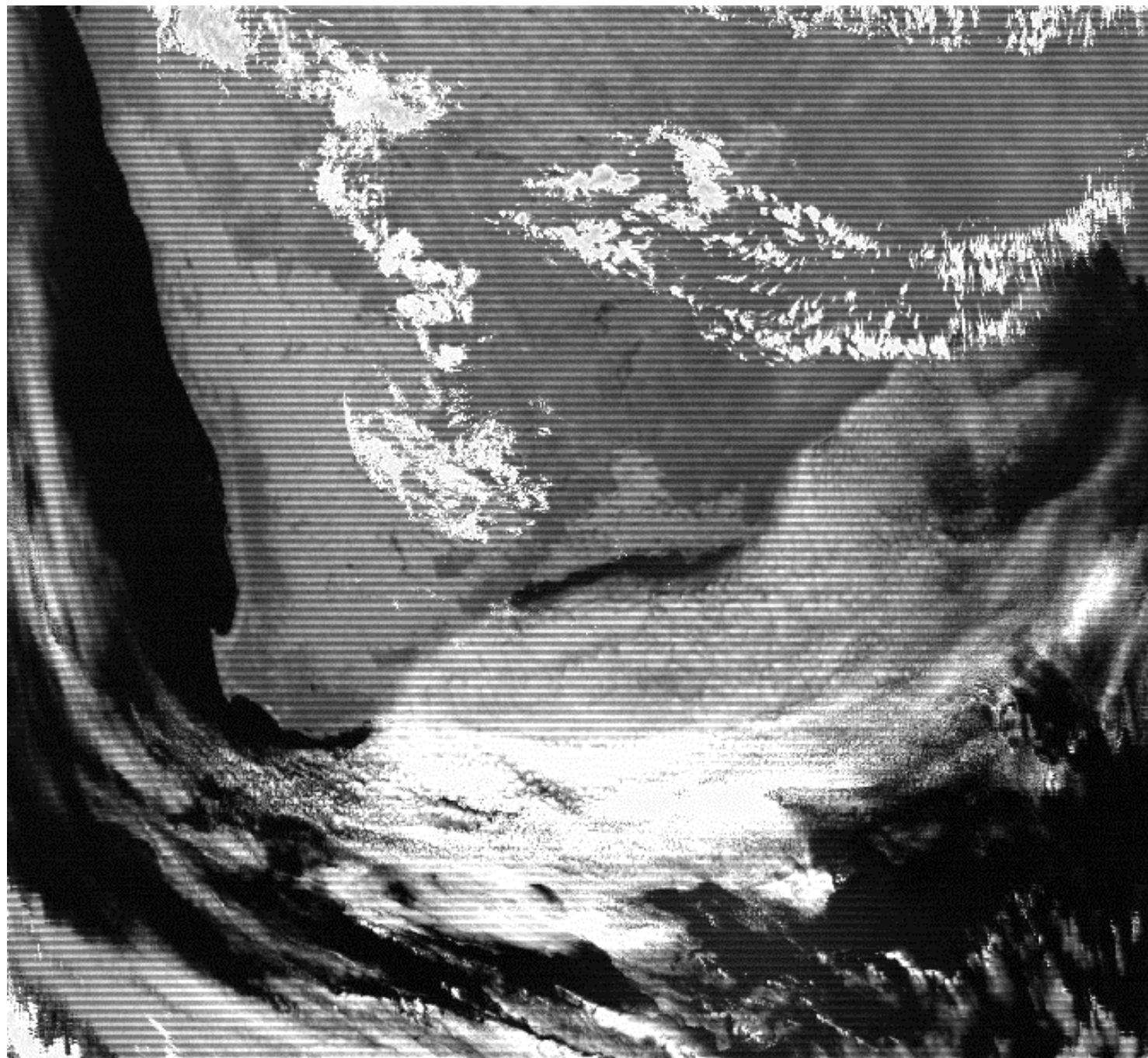
Dec 8, 2000
0215 UTC
Band 26
.020 influence
removed



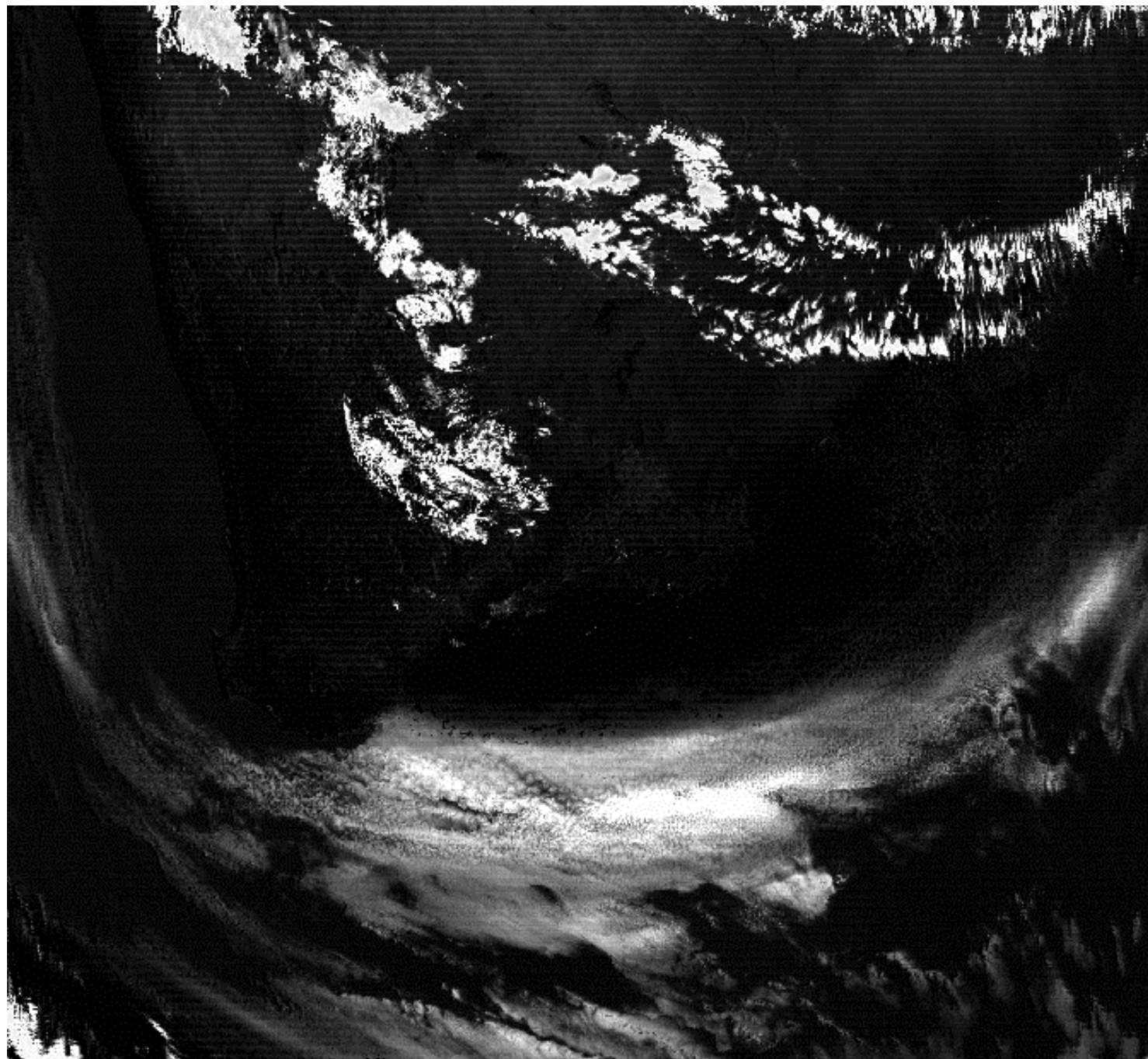
Dec 09, 2000
0215 UTC
Band 5
W. Australia



Dec 09, 2000
0215 UTC
Band 26
Uncorrected



Dec 09, 2000
0215 UTC
Band 26
Detector
dependent
correction



Detector dependent correction of MODIS B26 (1.38um) imagery for B5 (1.24um) influence

$$L_{26, i, \text{cor}} = L_{26, i, \text{unc}} - A_i * L_{5, i}$$

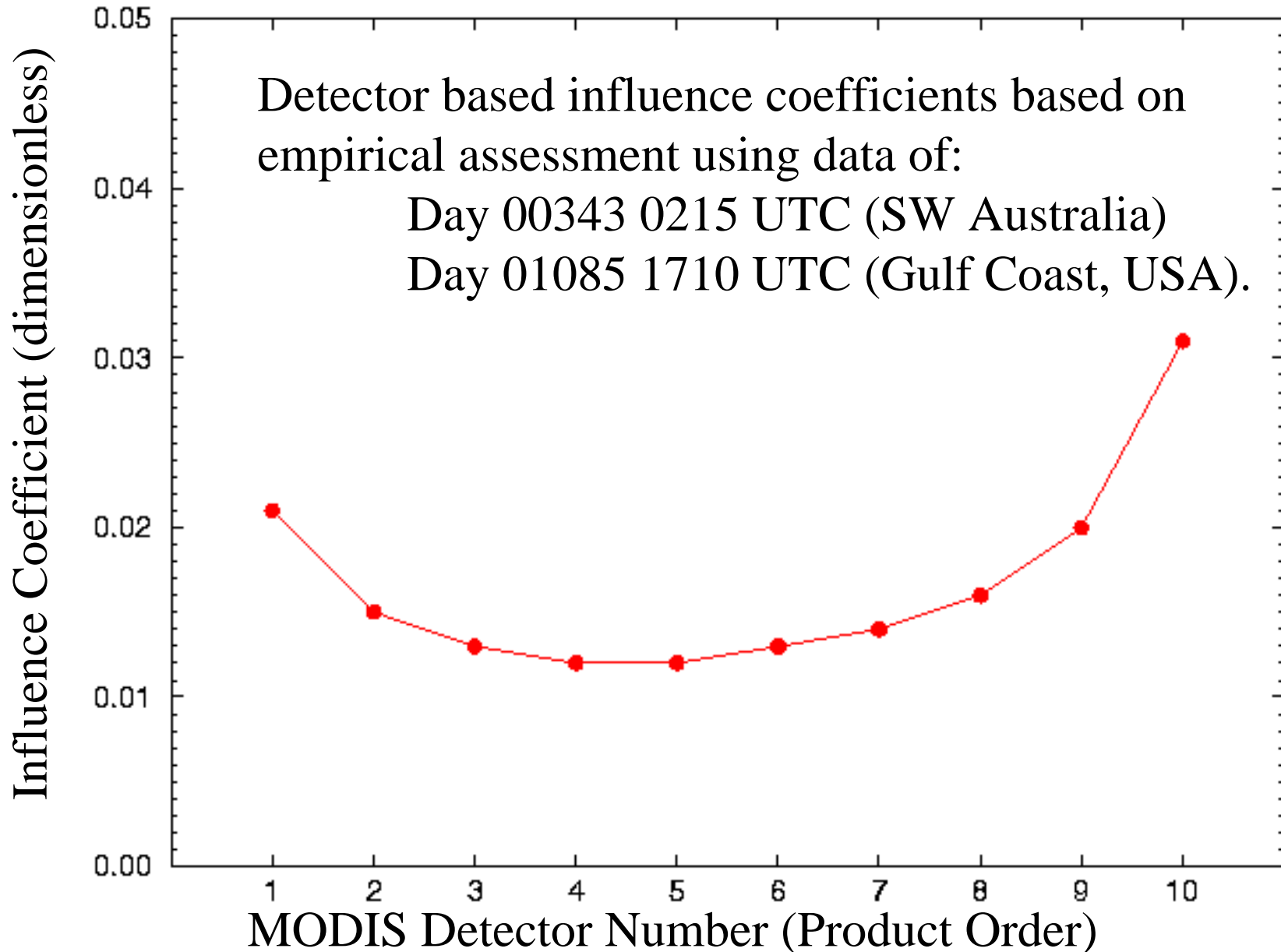
$L_{26,i}$ is B26 radiance for detector i

$L_{5,i}$ is B5 radiance for detector i

A_i is influence coefficient for detector i

MODIS SWIR Band Crosstalk Assessment

Band 5 influence on Band 26 in radiance domain

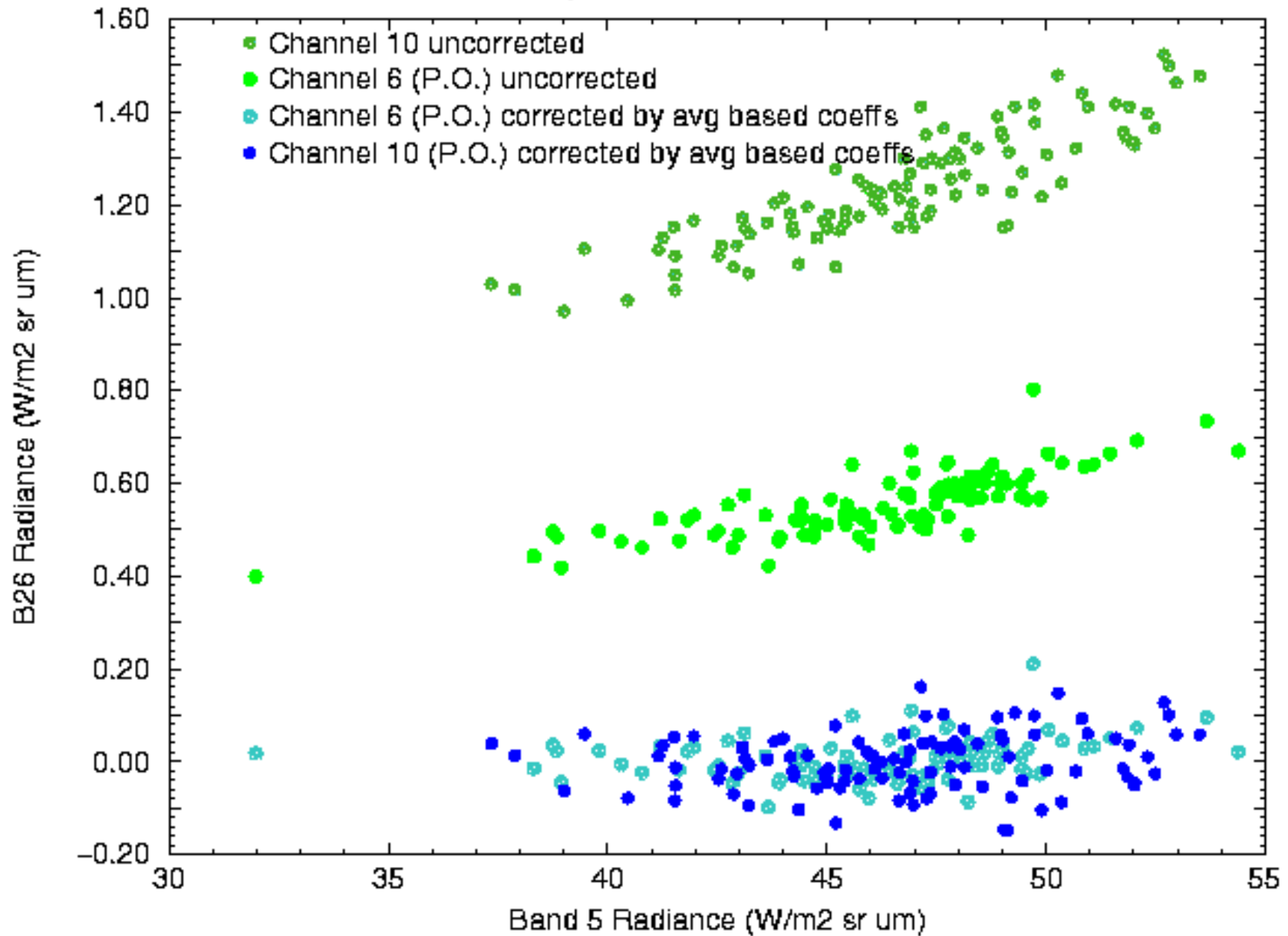


MODIS Channel (Product Order)	B5 Influence Coefficients A_i Day 00343, 01085 (V1)	B5 Influence Coefficients A_i Day 01153 (V2)
1	.021	.017
2	.015	.013
3	.013	.011
4	.012	.010
5	.012	.010
6	.013	.012
7	.014	.012
8	.016	.014
9	.020	.017
10	.031	.027

Influence Coefficient estimation assumes that a regression relationship tracks through 0,0 origin point

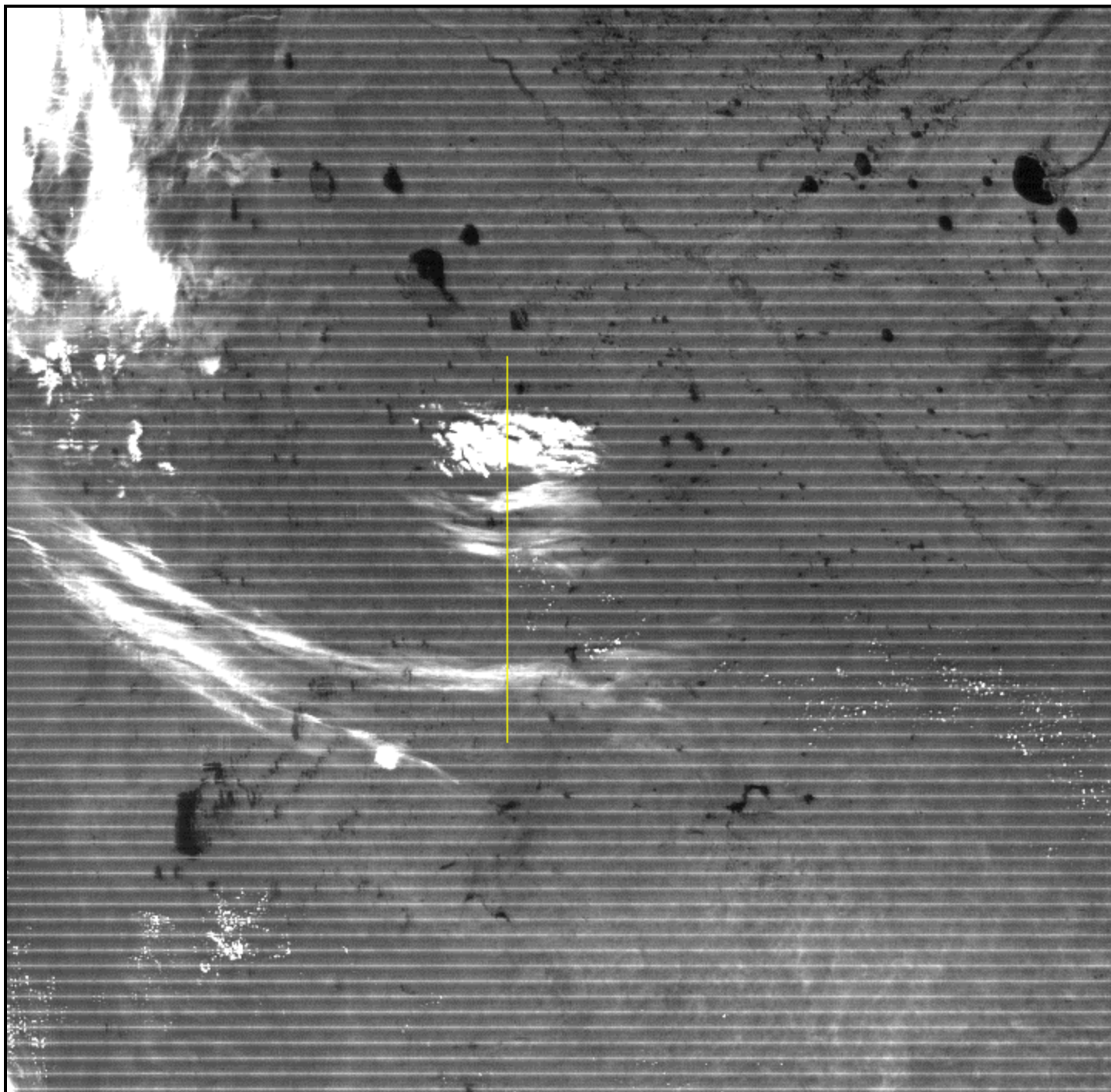
Band 26 Correction for Band 5 Influence

Day 01153, 1645 UTC; V3.X

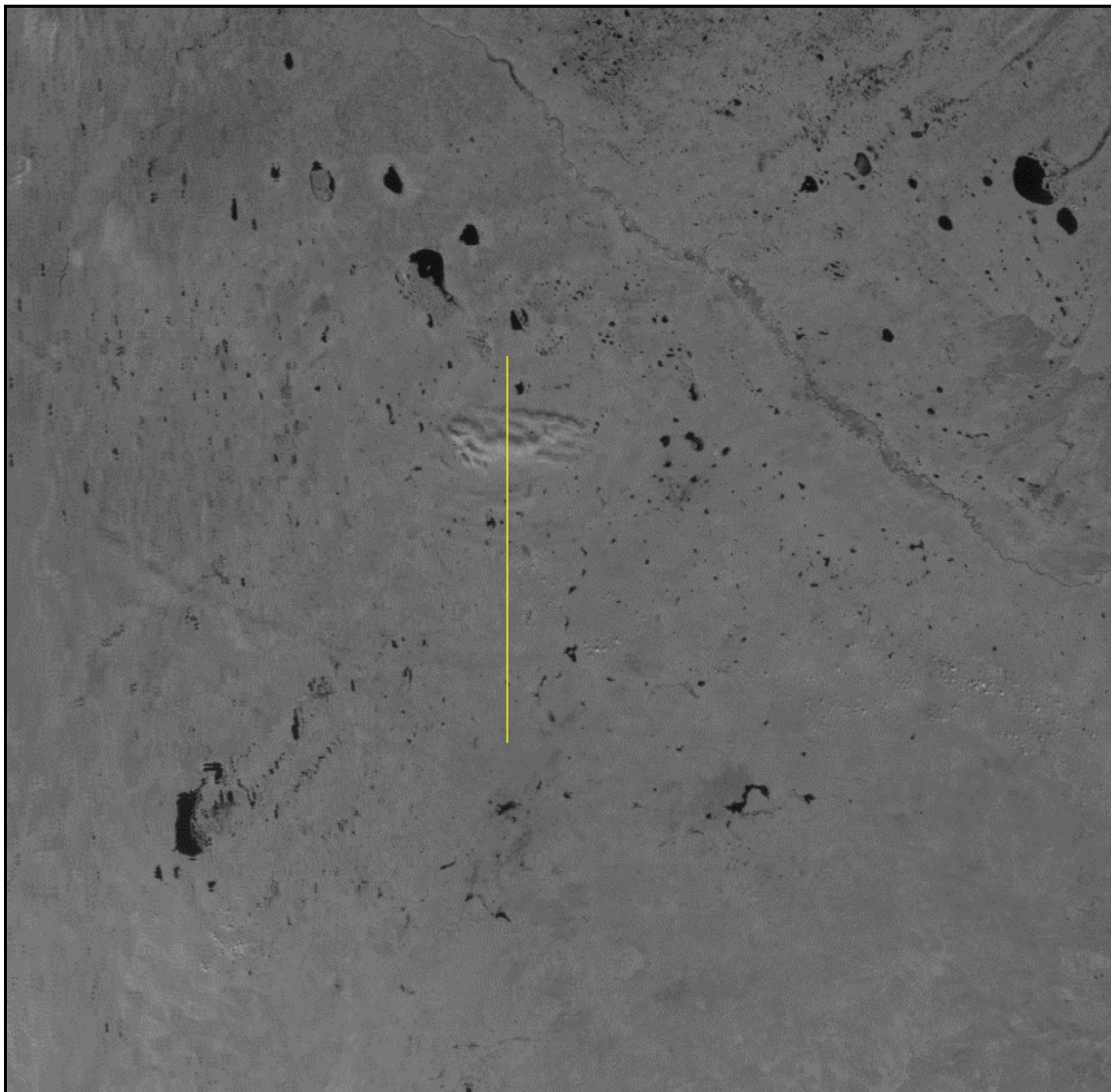


Day 01111, 1610 UTC
Lake Balquash Region (Asia)

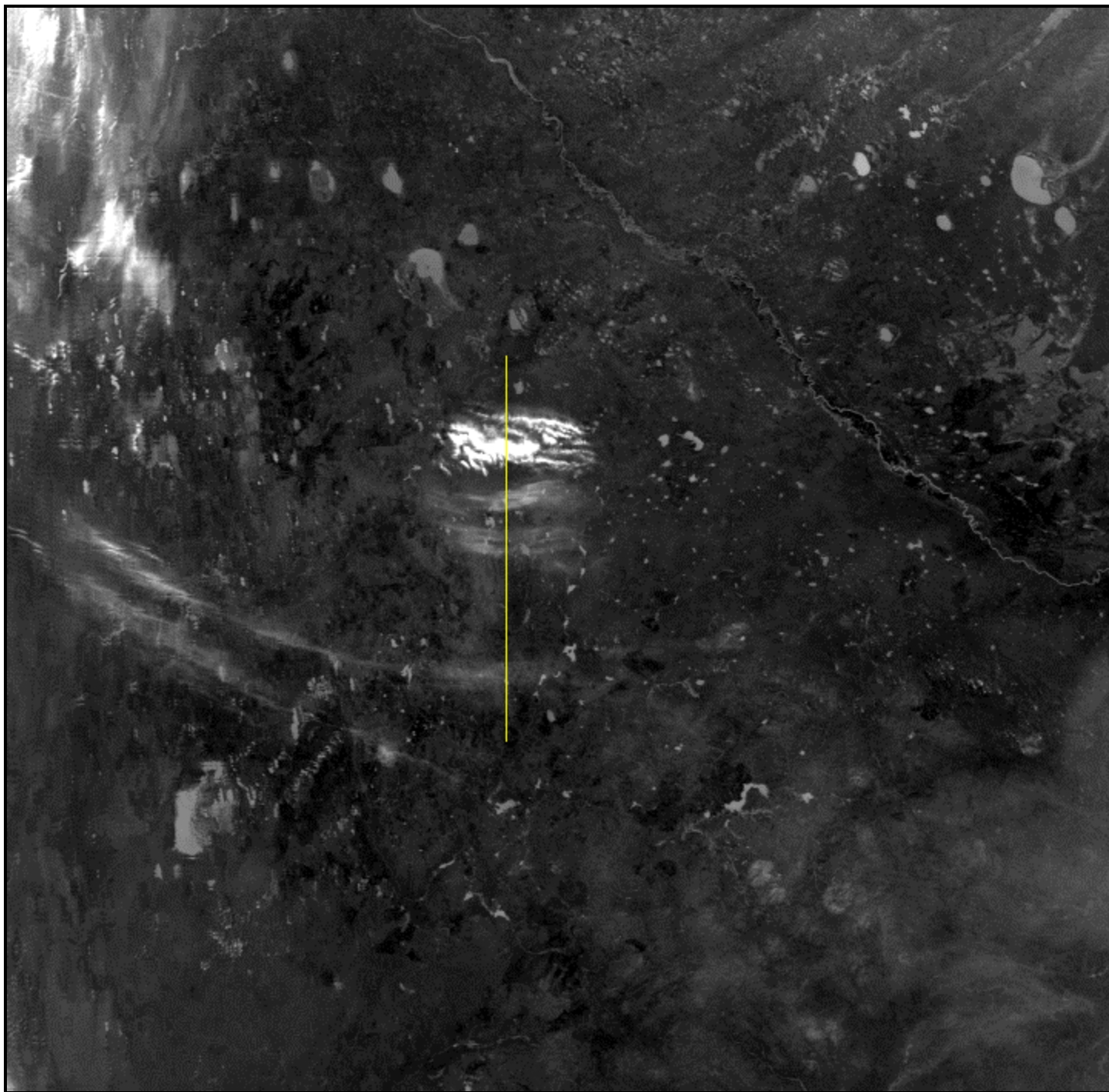
Apr 21, 2001
0610 UTC
Band 26
Uncorrected



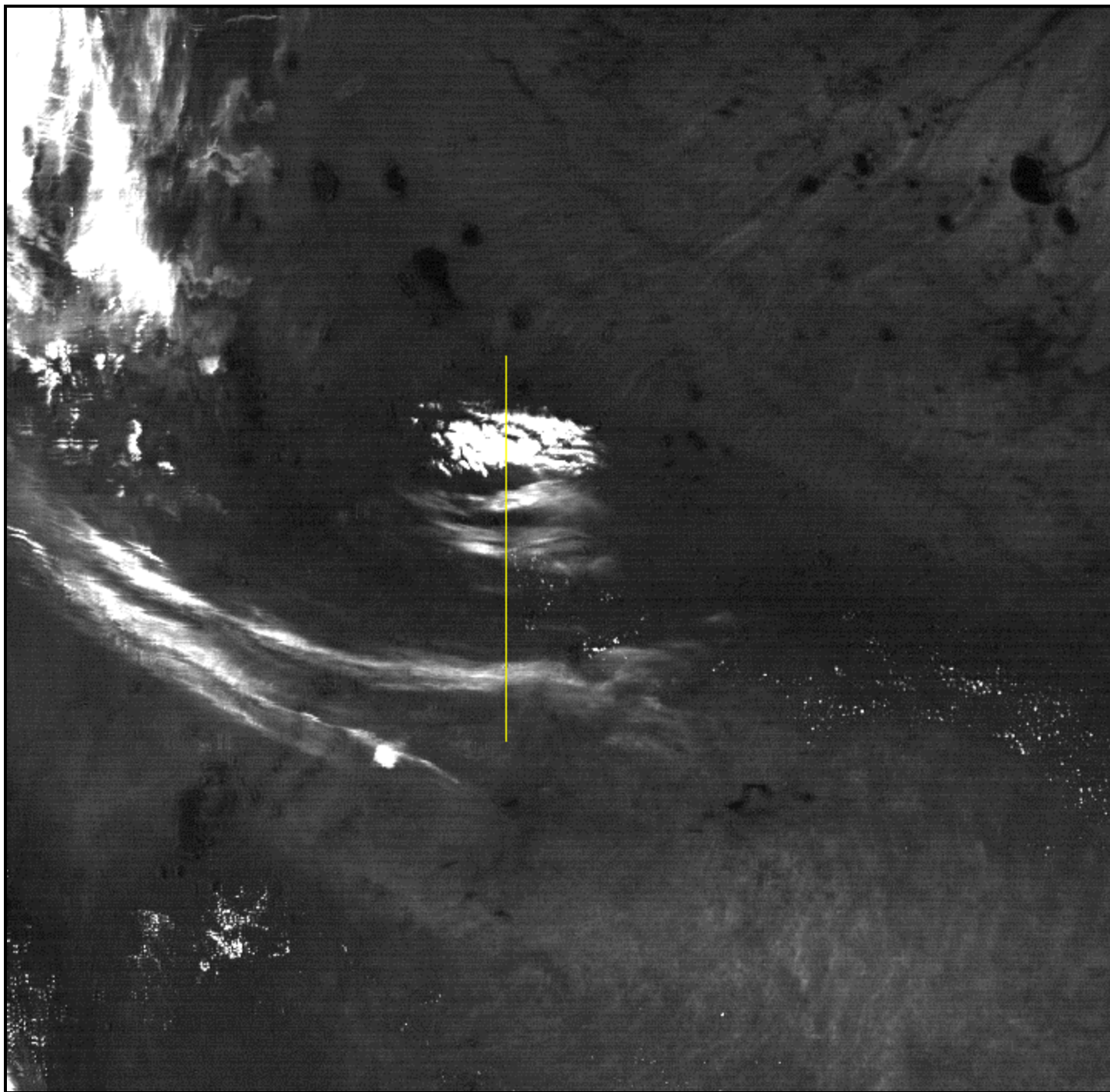
Apr 21, 2001
0610 UTC
Band 5
(Offender)



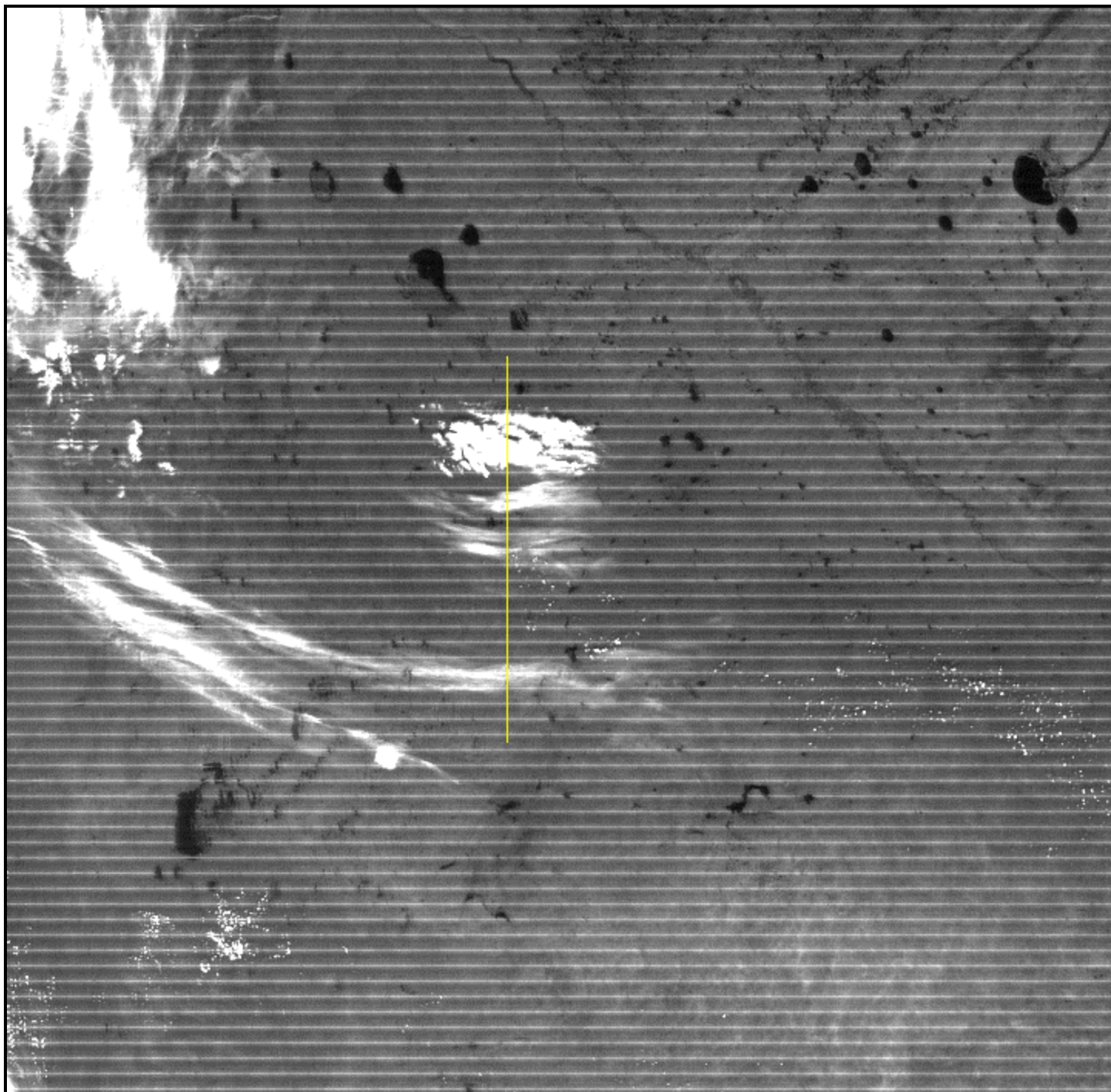
Apr 21, 2001
0610 UTC
Band 31
11um



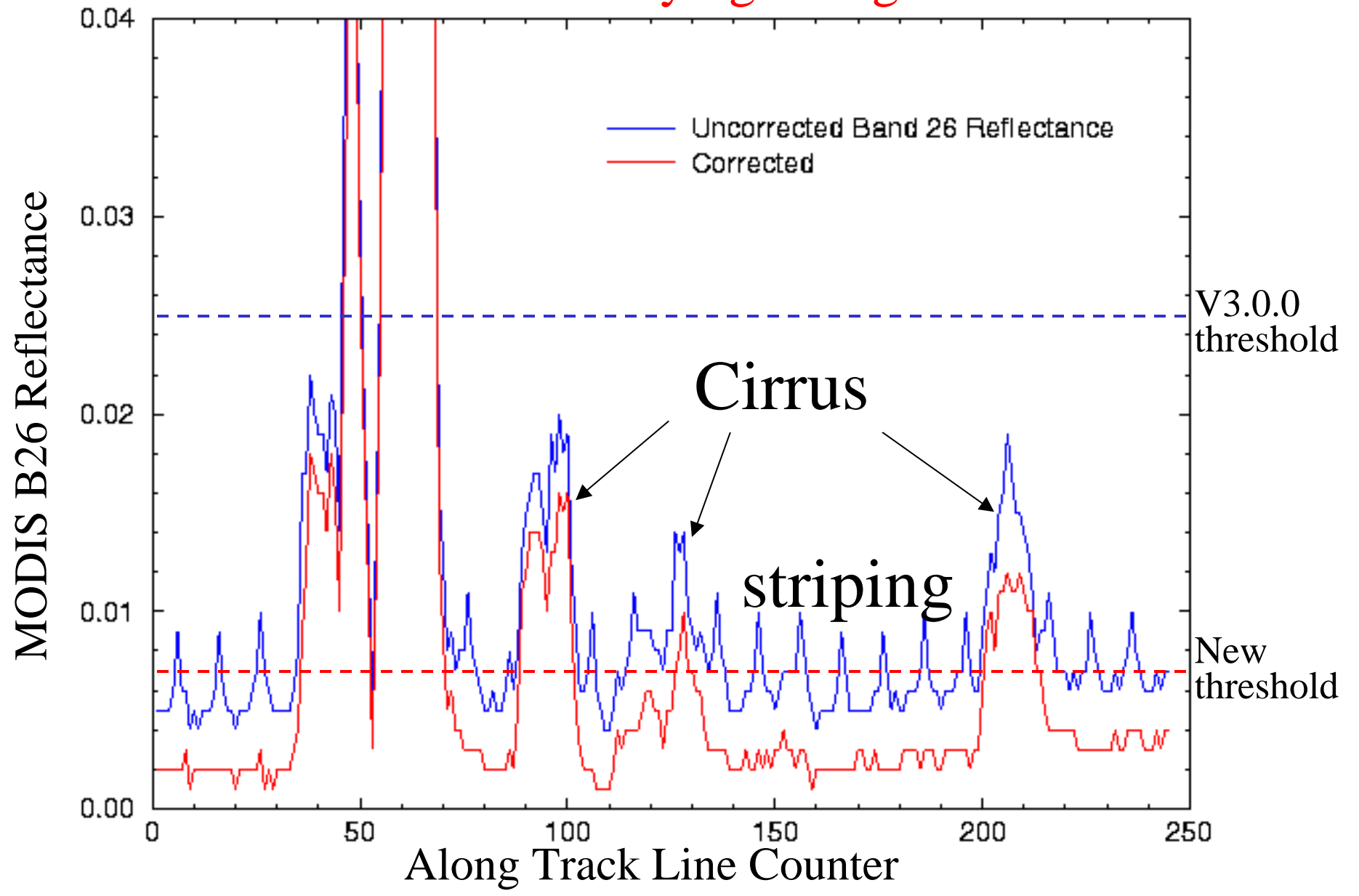
Apr 21, 2001
0610 UTC
Band 26
Corrected



Apr 21, 2001
0610 UTC
Band 26
Uncorrected



Reducing B26 striping increases the contrast between cirrus cloud and the underlying background surface

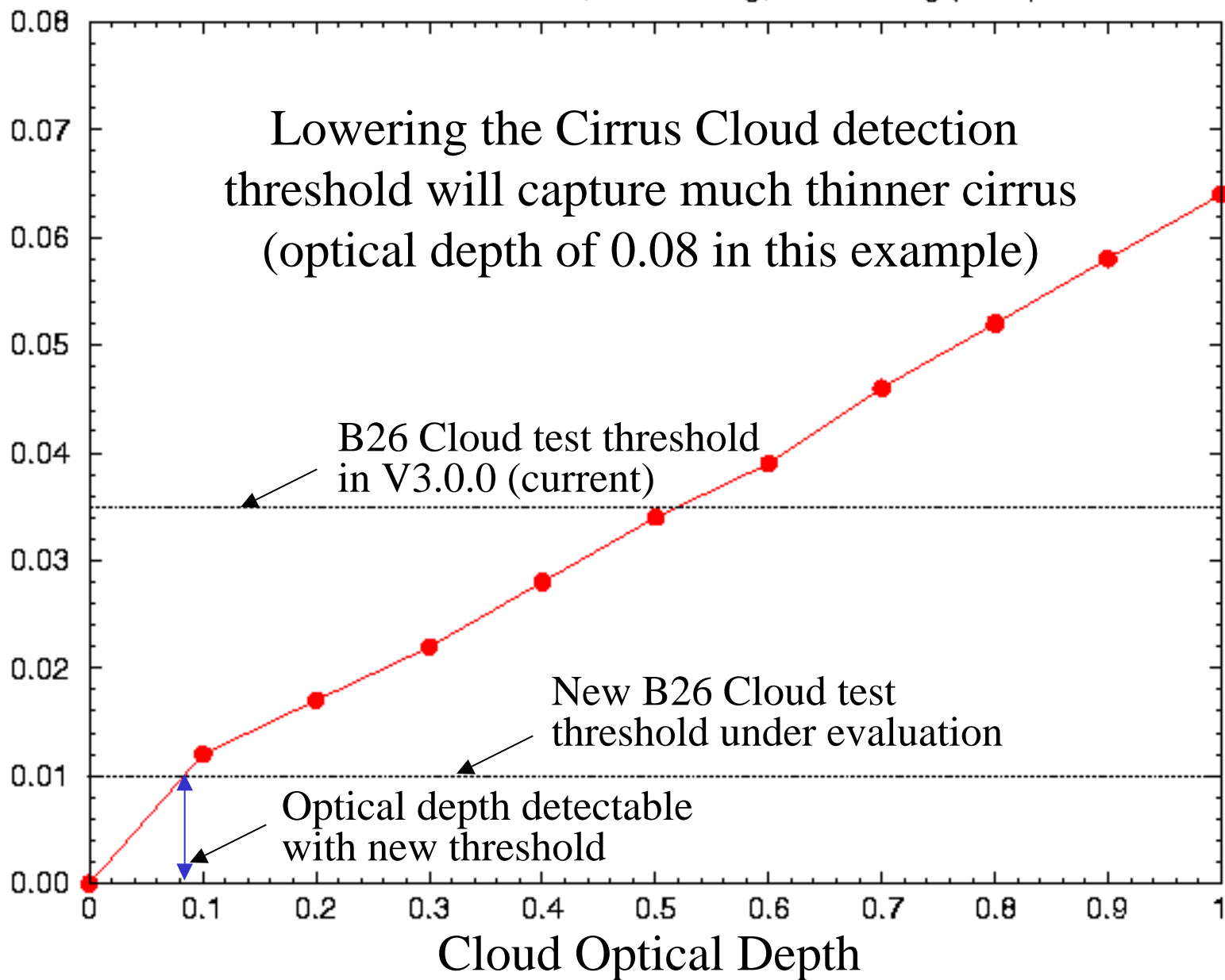


1.38um Cirrus Test Cloud Detection

midlatitude cirrostratus; SZA 30 deg, VZA 00 deg (nadir)

1.38um Cloud Model Reflectance

Lowering the Cirrus Cloud detection threshold will capture much thinner cirrus (optical depth of 0.08 in this example)



B5 Influence on B26

- Anecdotal evidence suggests surface features and striping can be largely removed from B26 using a B5 based correction
- Atmospheric water vapor influence on B26 remains physical.
- Pre-launch OOB data for B26 suggests filter leak (pinhole?) near B5 spectral position
- Problem: As characterized by Pre-launch data, the pinhole leak is about a factor of 2-3 too small to fully explain B26 behavior.