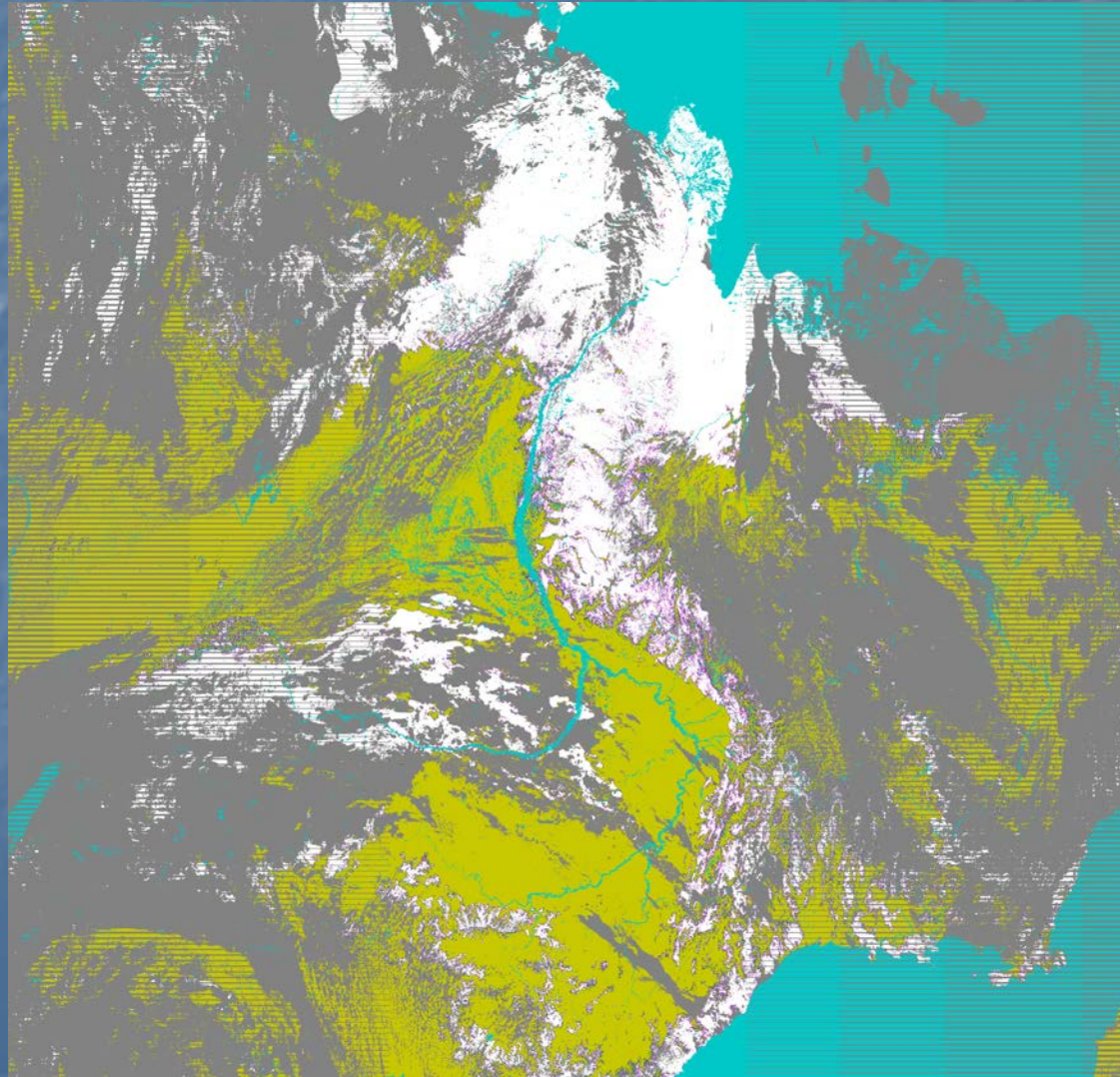


The Influence of Uncertainty in Cloud Masking on the Quality of VIIRS Snow Products

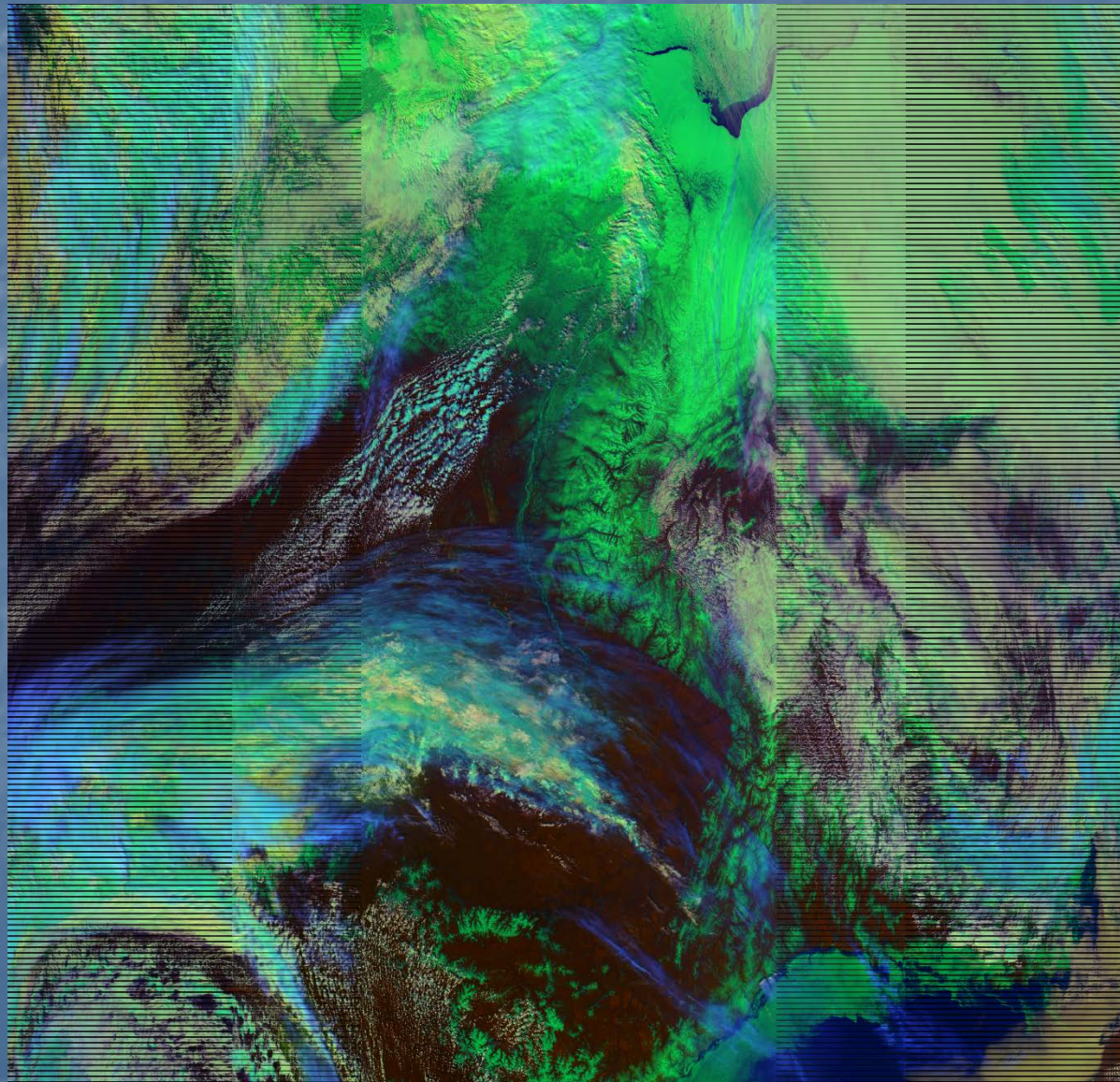
Igor Appel
IMSG/NOAA

VIIRS Snow Product on May 13, 2012



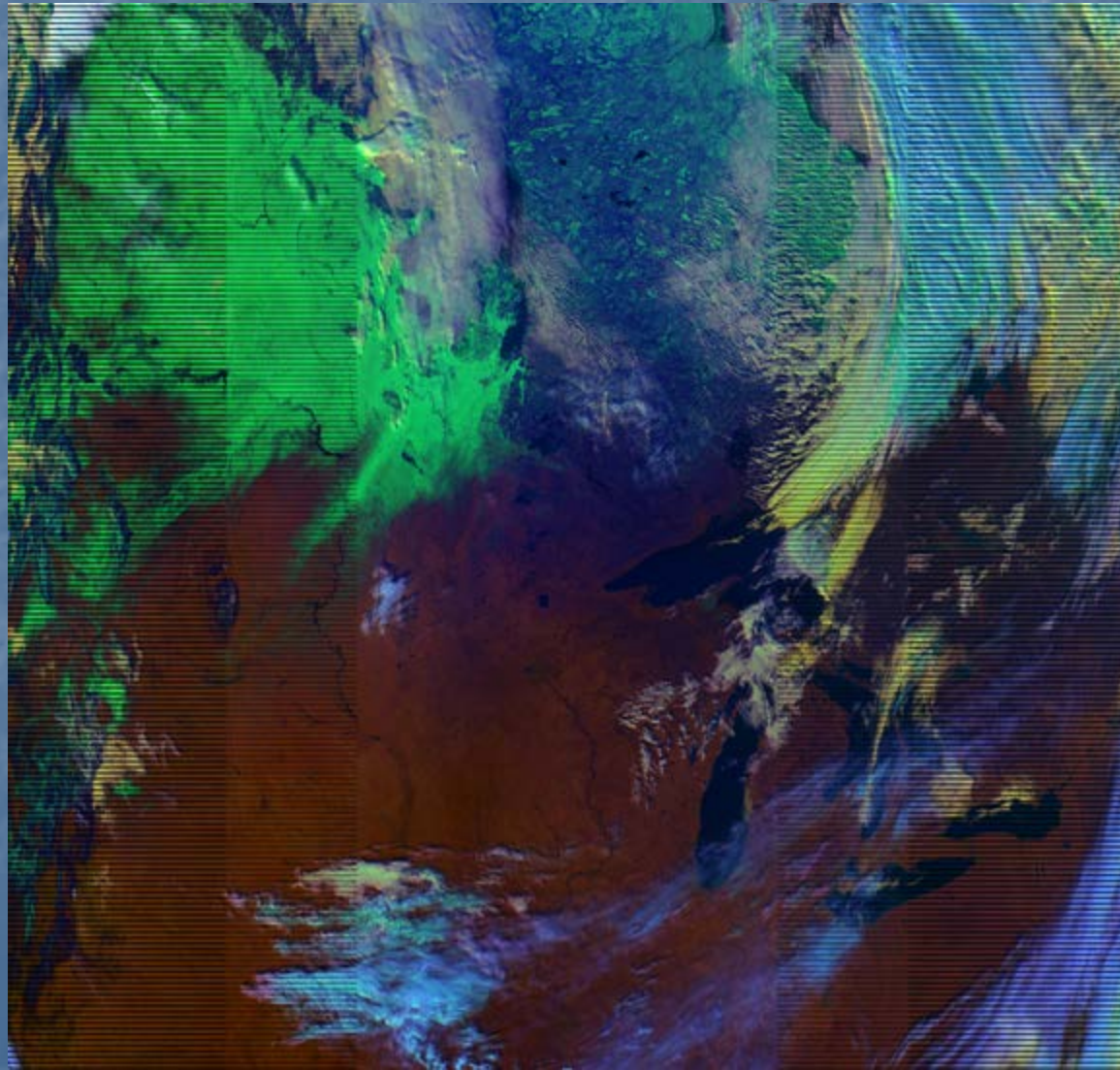
January 29, 2014

False Color Image



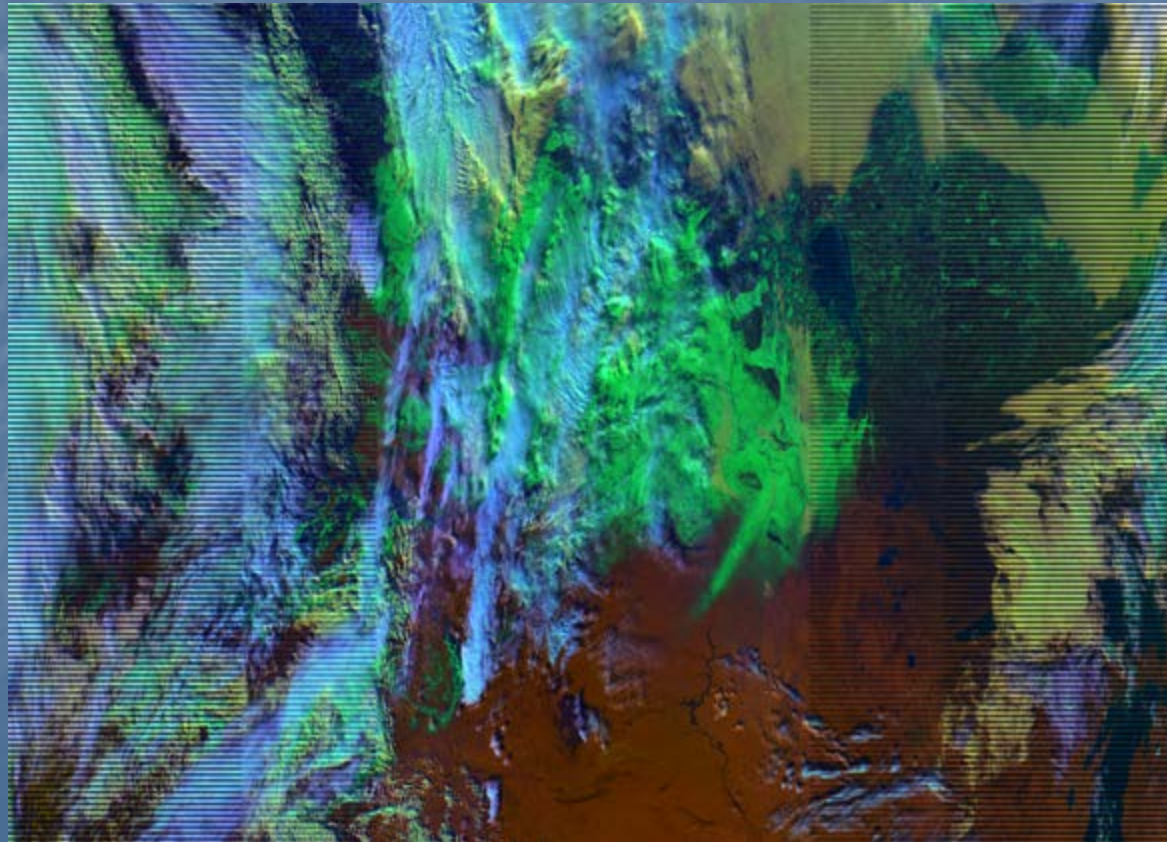
January 29, 2014

False Color Image on November 15, 2012



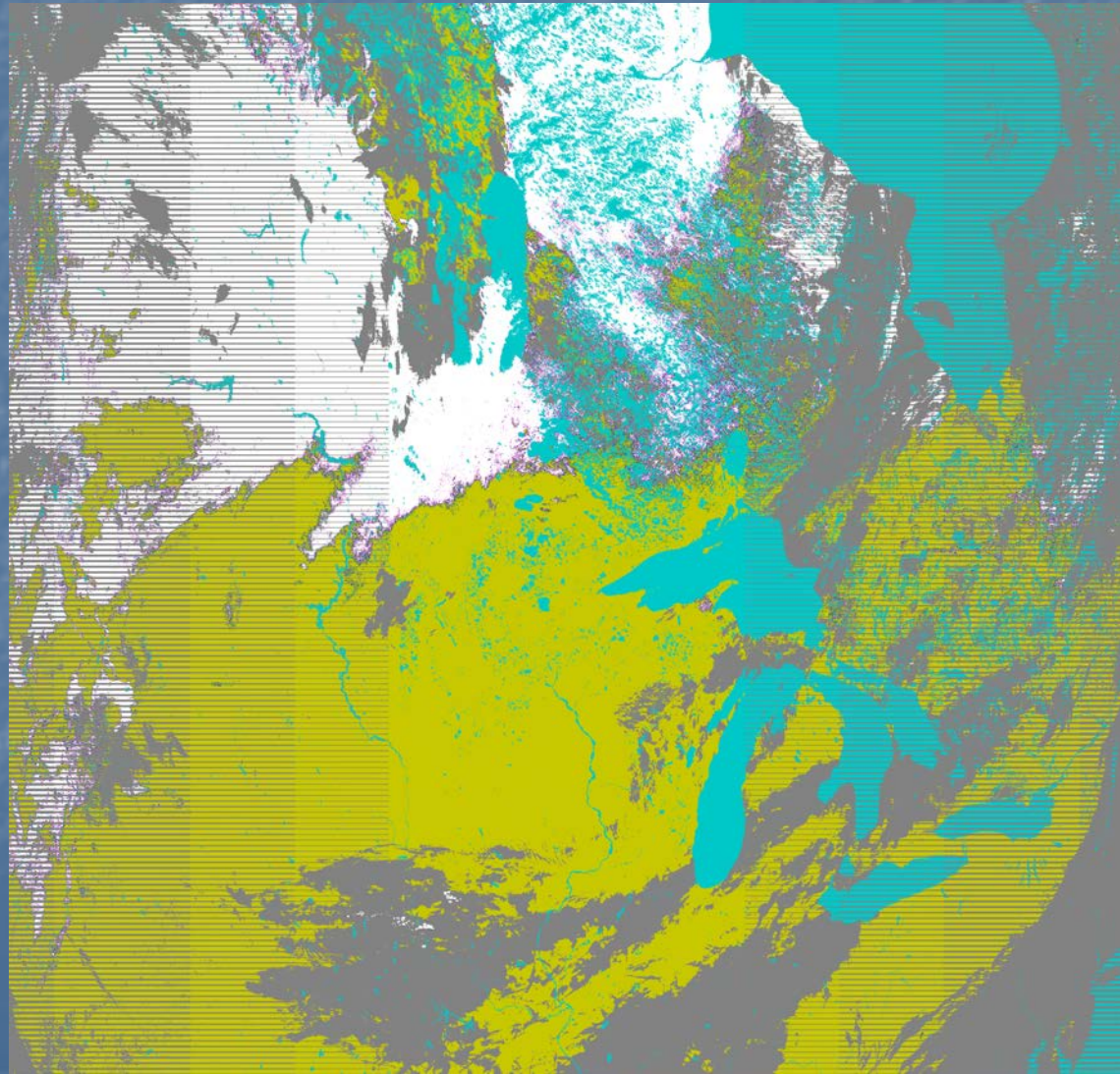
January 29, 2014

False Color Image on November 18, 2012



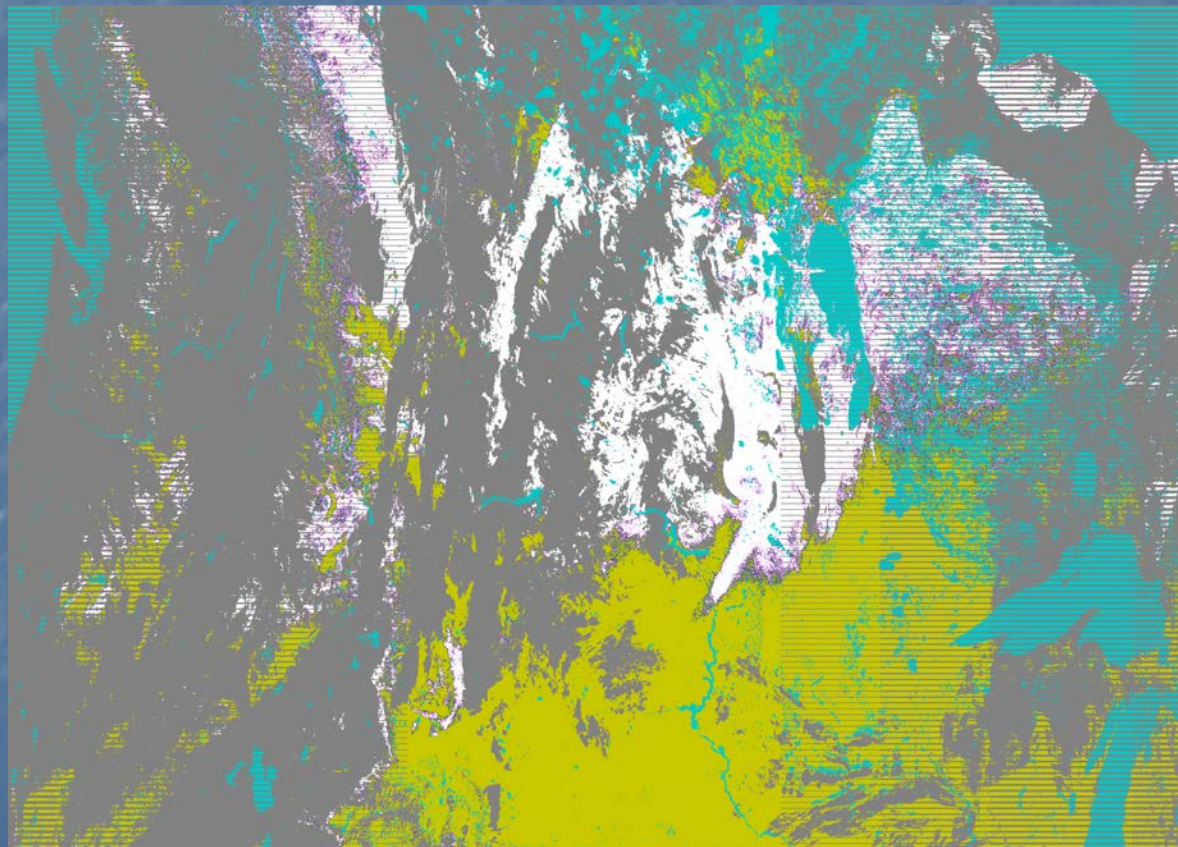
January 29, 2014

VIIRS Snow Product on November 15, 2012

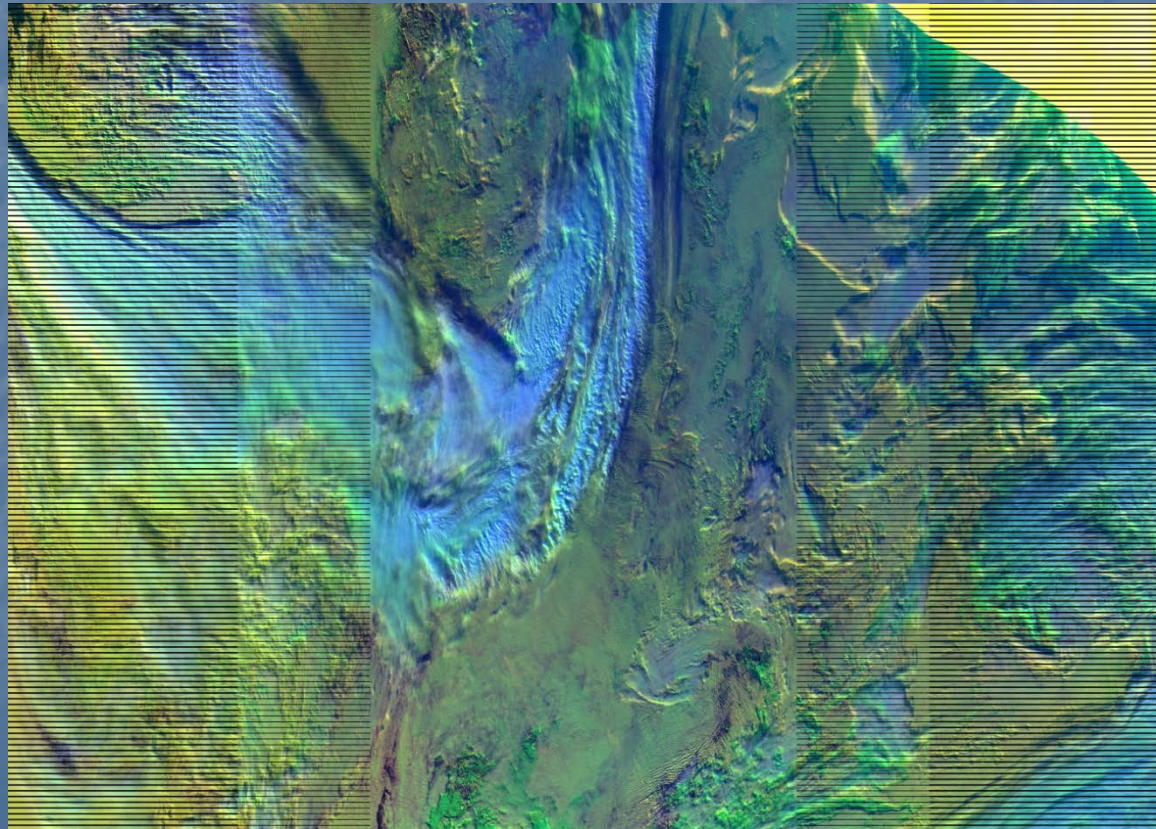


January 29, 2014

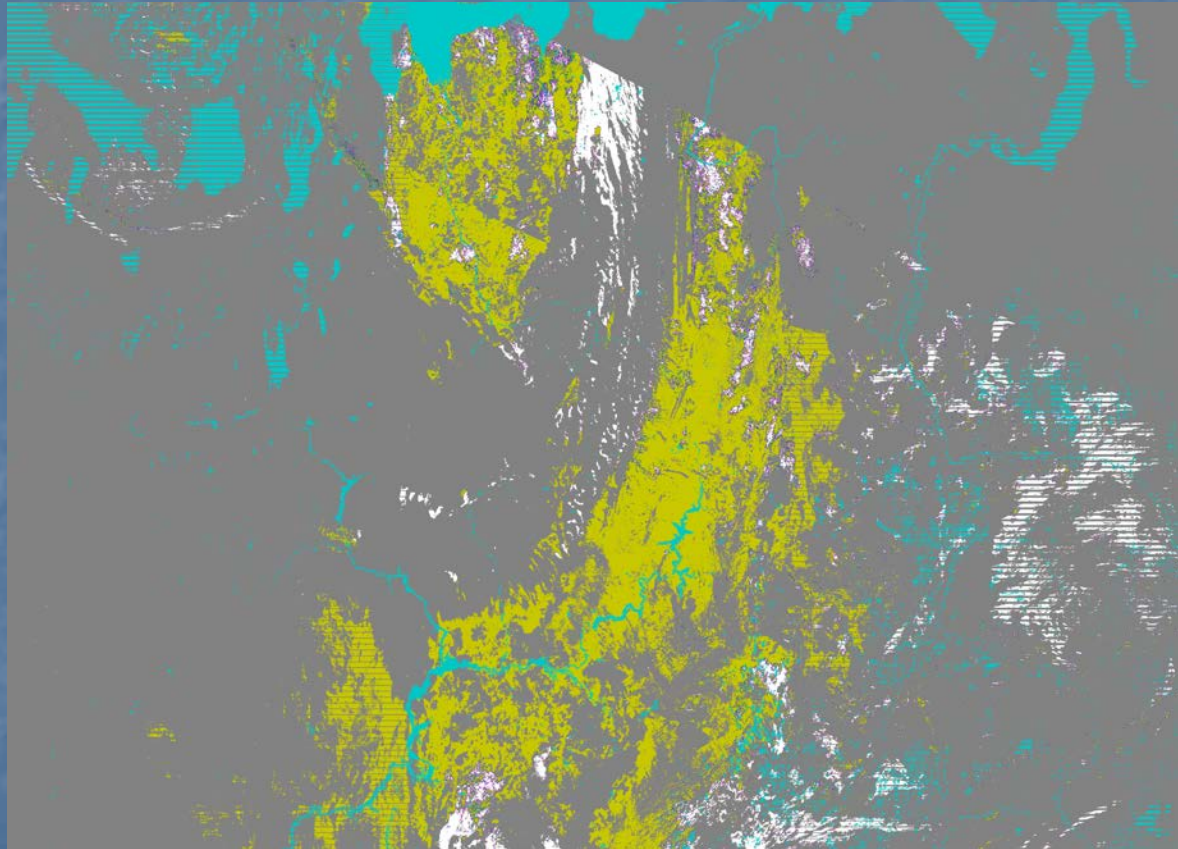
VIIRS Snow Product on November 18, 2012



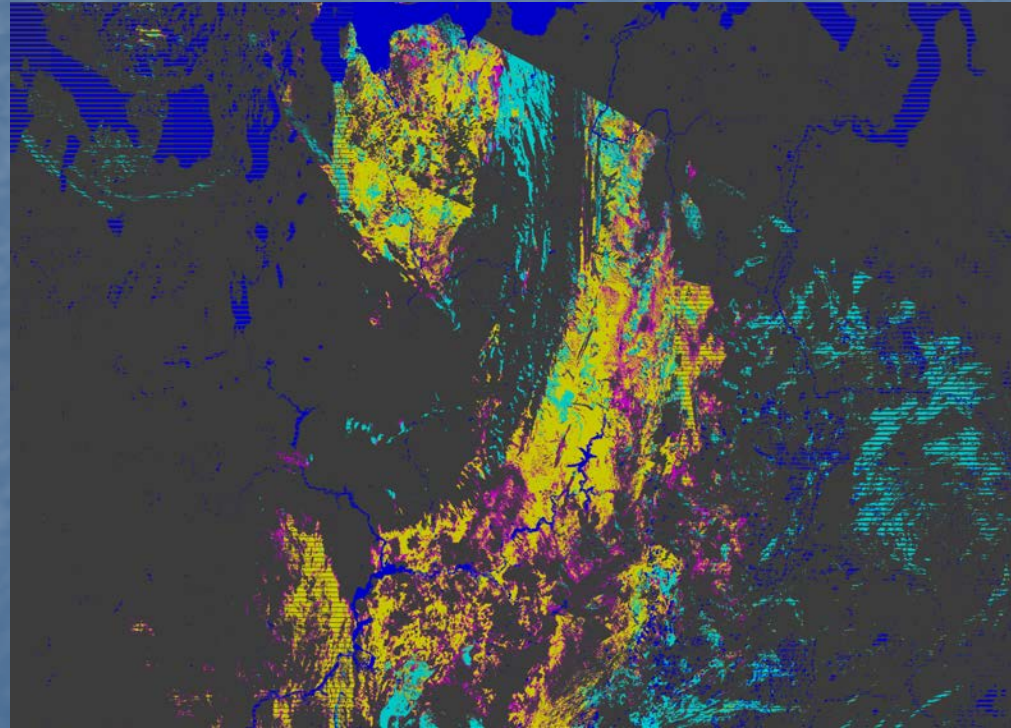
False Color Image on November 15, 2012



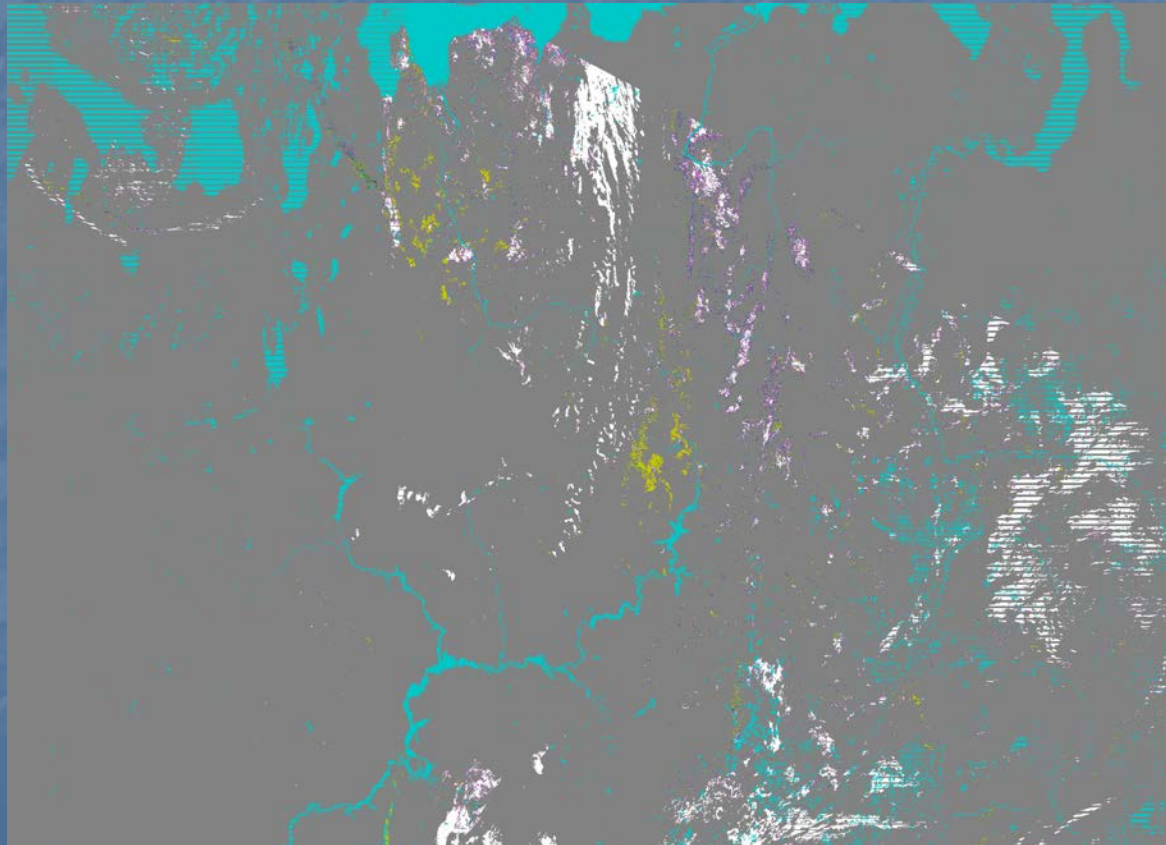
Snow Retrieval on November 15, 2012



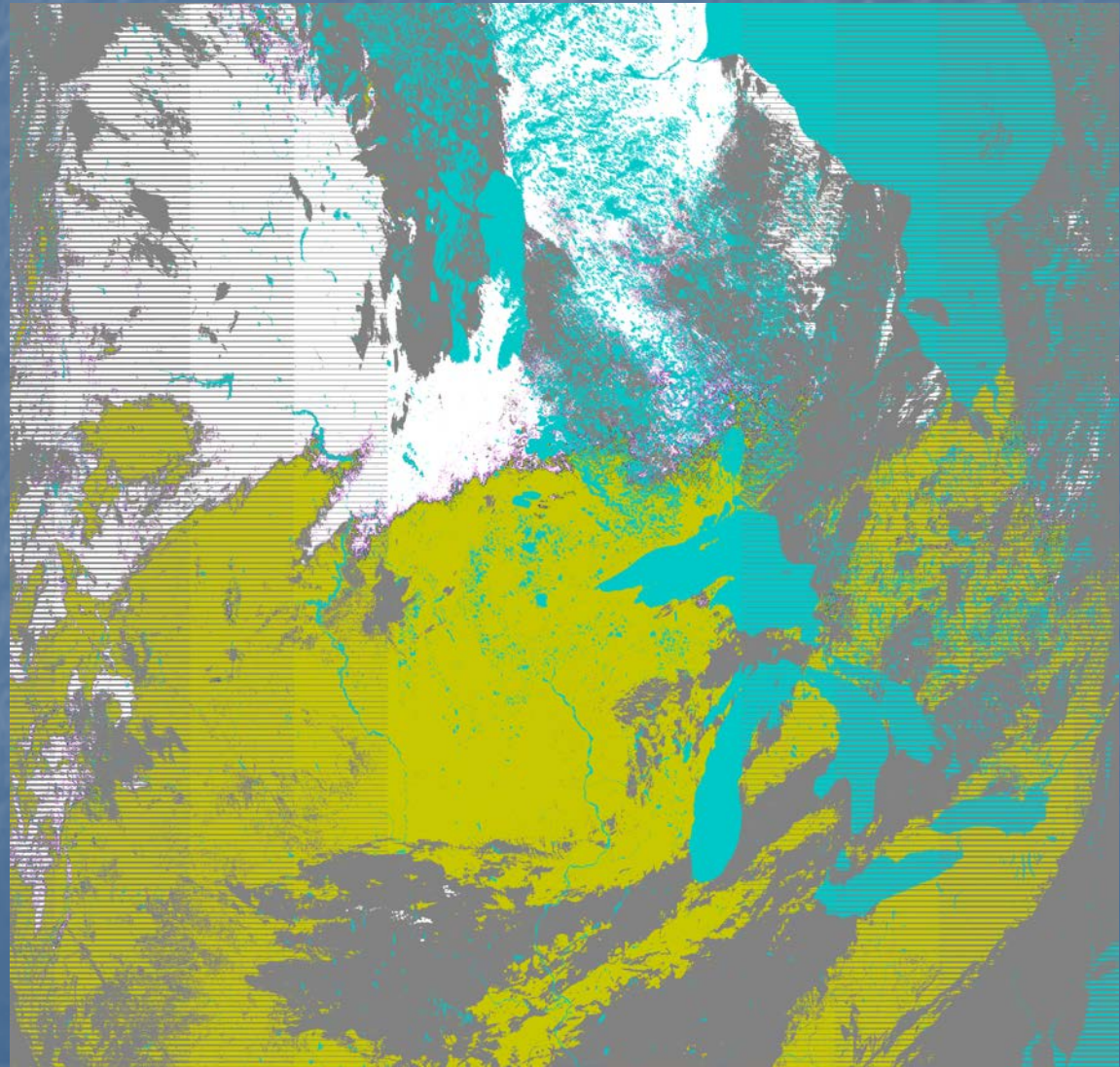
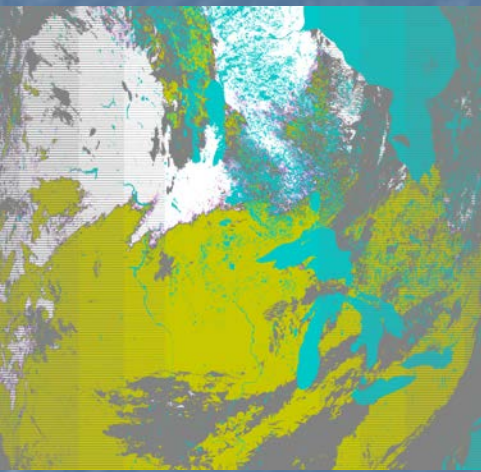
Different confidences of cloud mask 11/15/12



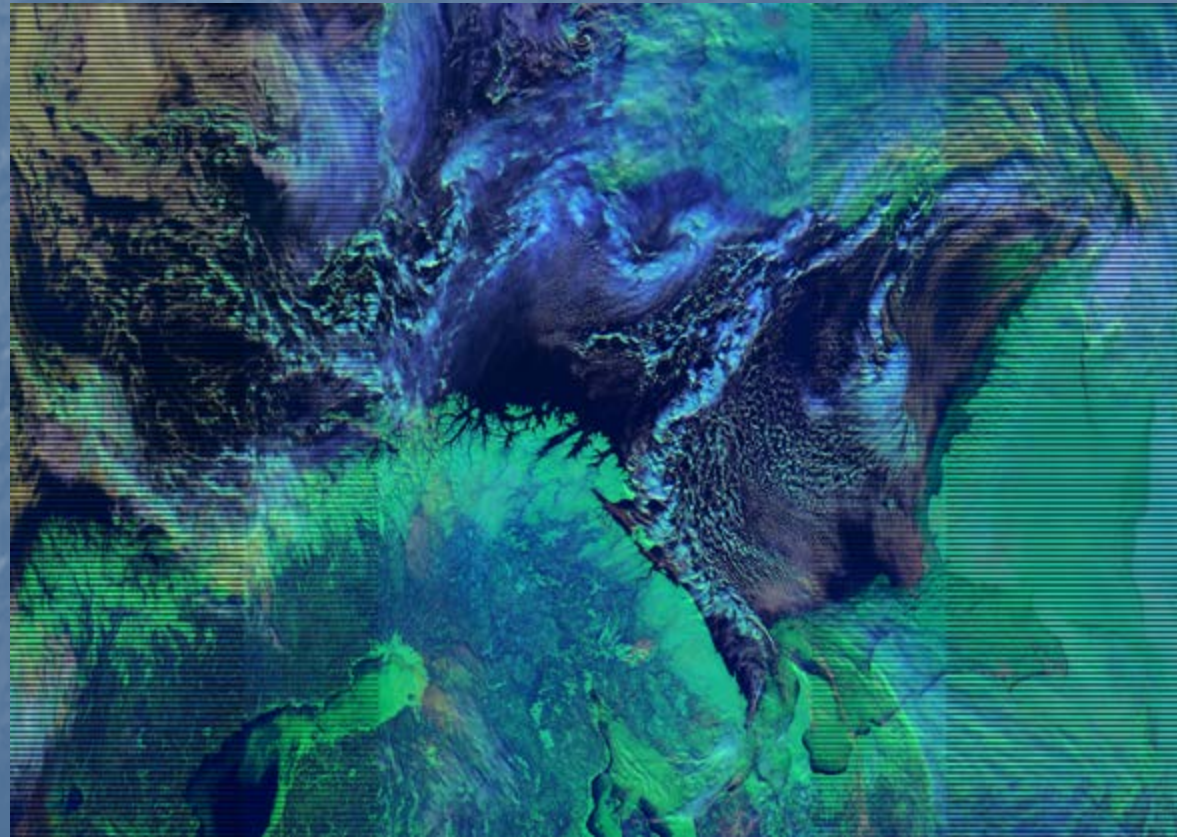
VIIRS Snow Product for "conservative" cloud mask



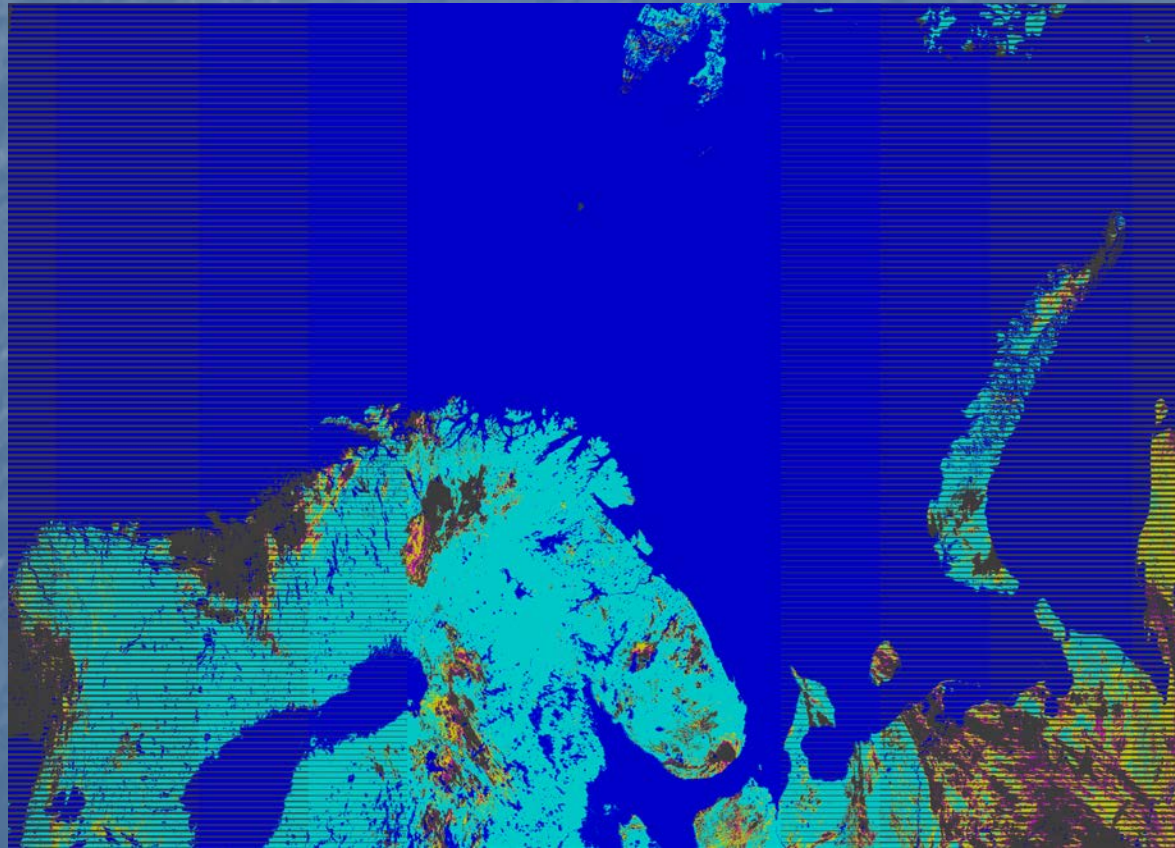
VIIRS Snow Product for Conservative Cloud Mask



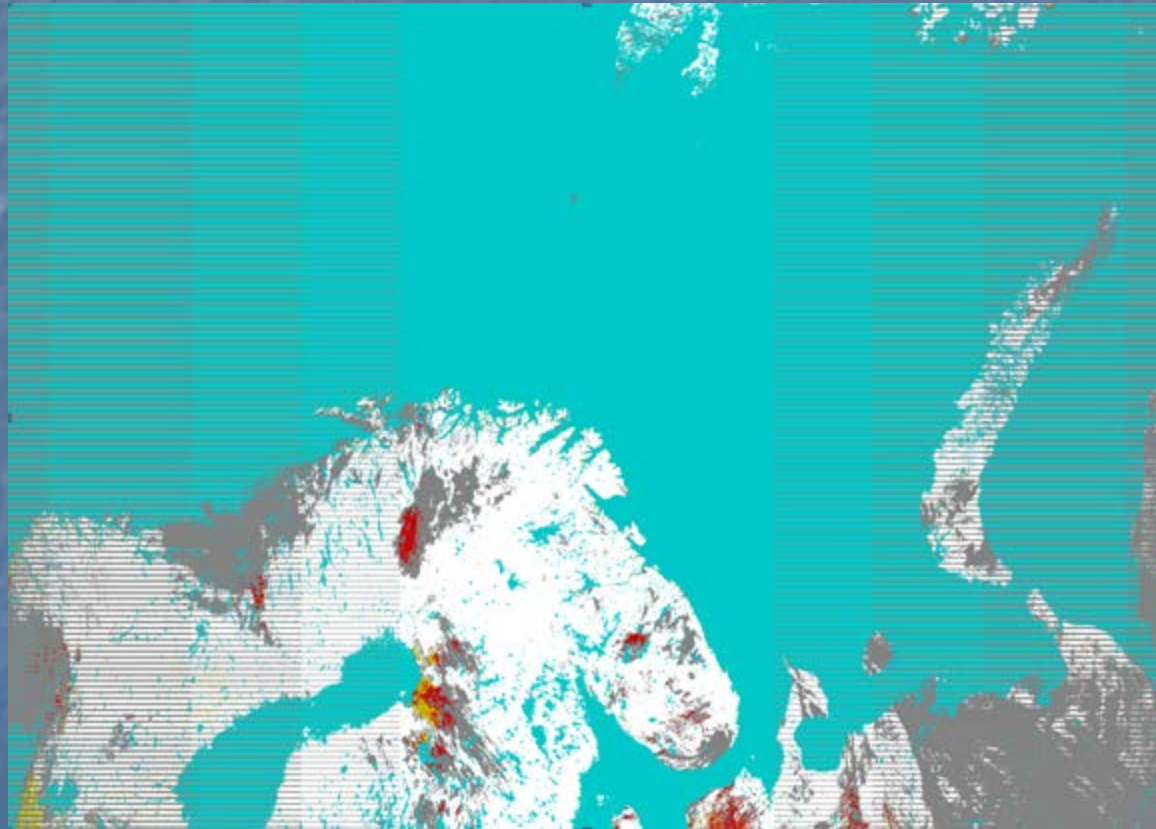
False Color Image on March 15, 2012



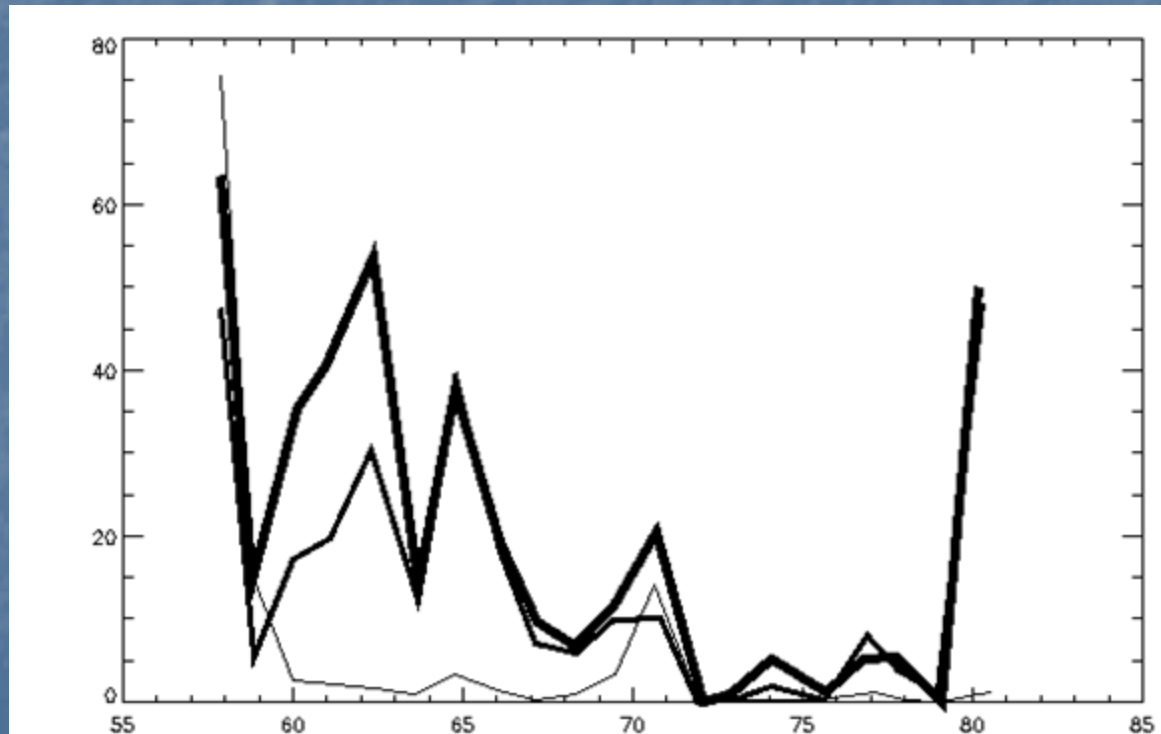
Different confidences of cloud mask 03/15/13



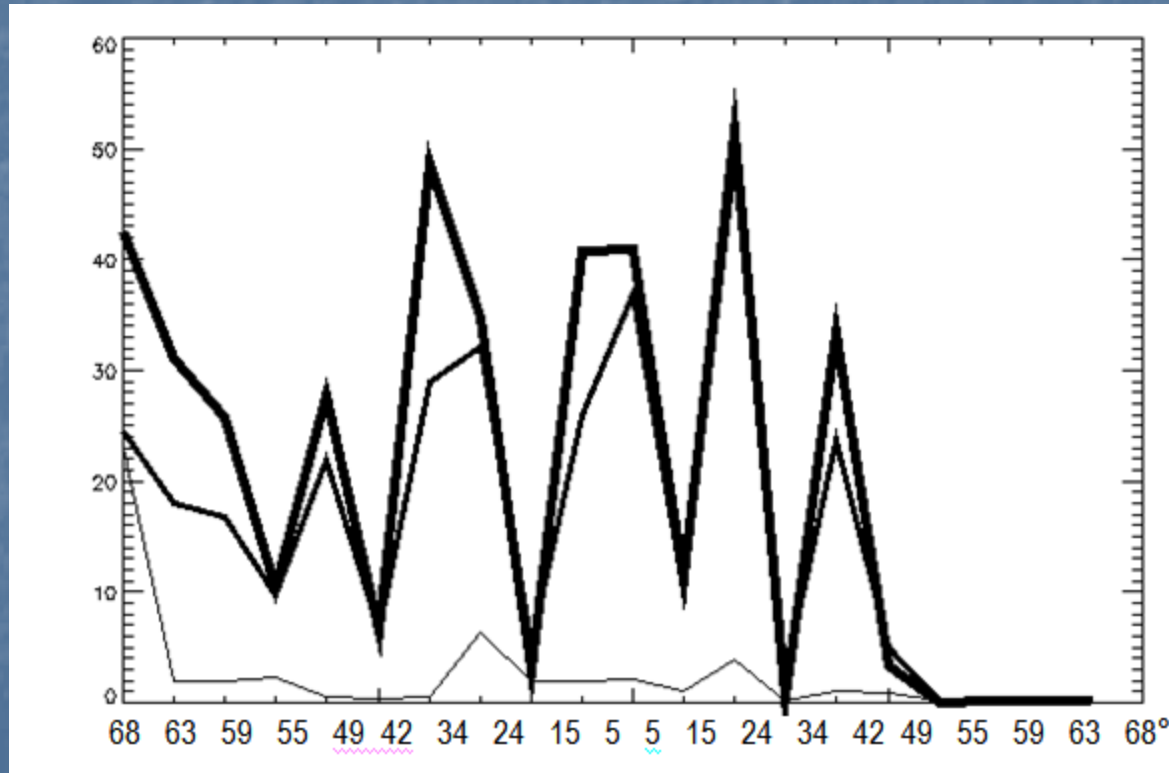
Omission Errors in Snow Retrieval on 03/15/2013



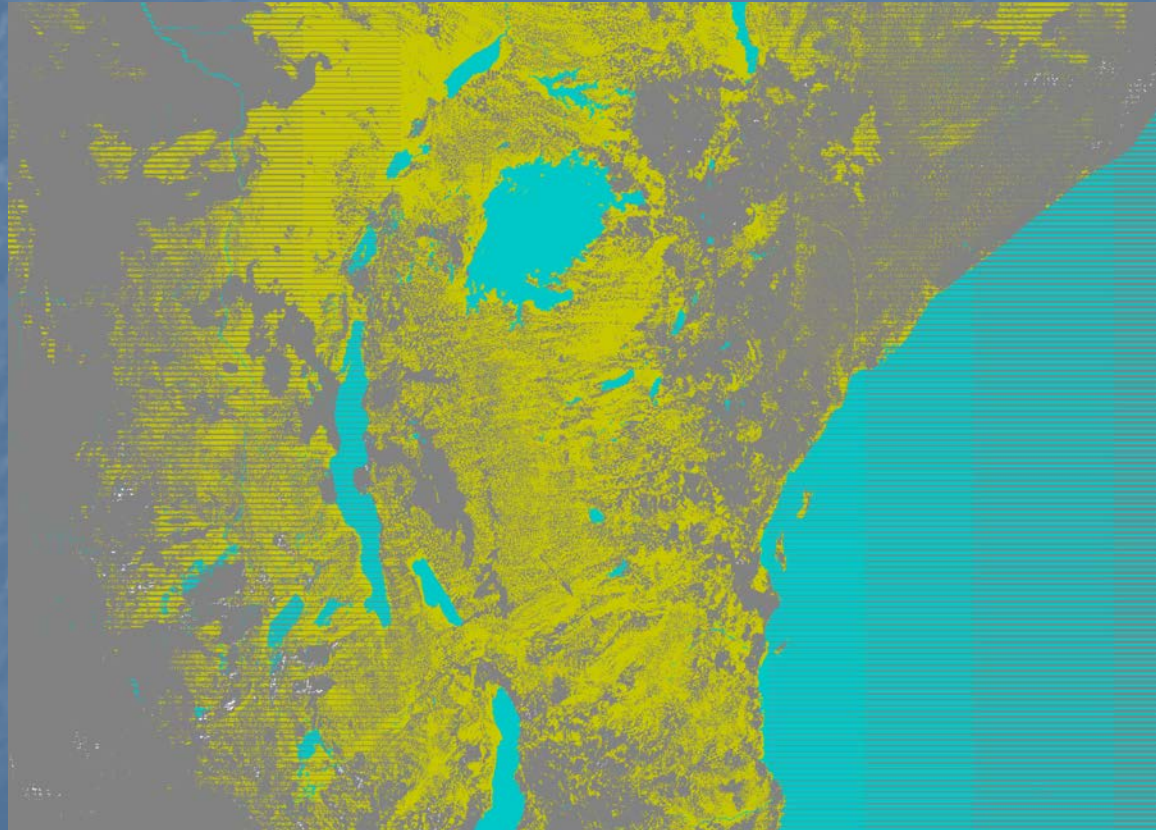
Omission Errors for Different Latitudes



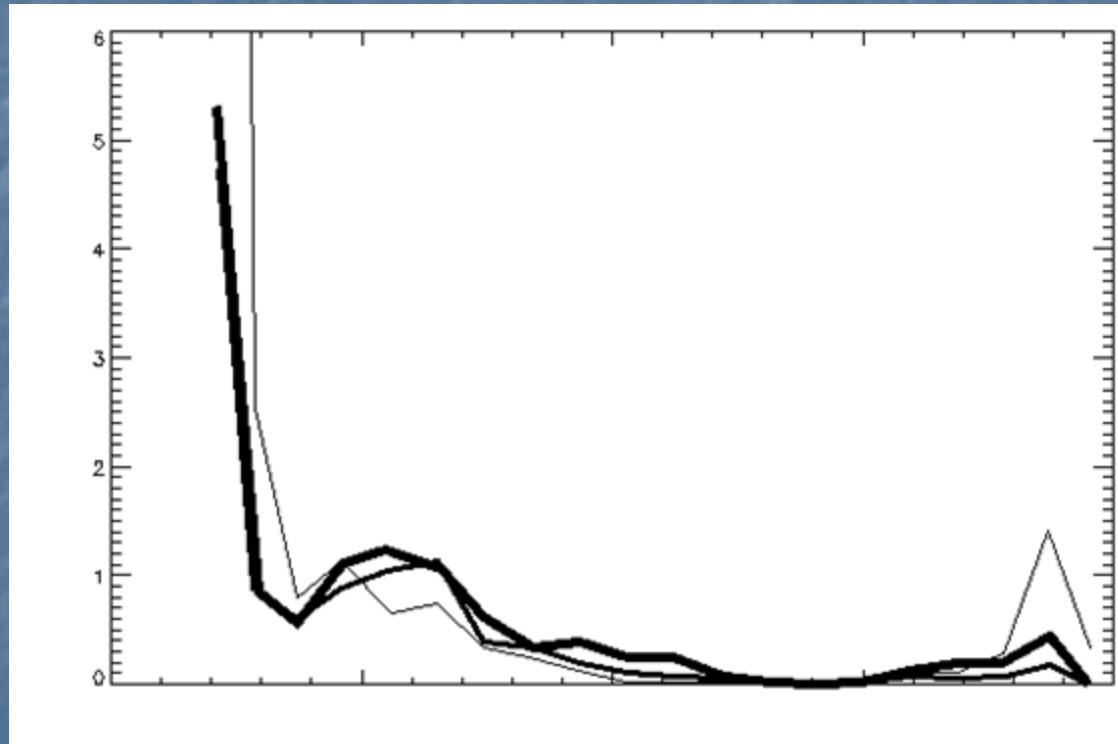
Omission Errors Depending on Scan Angles



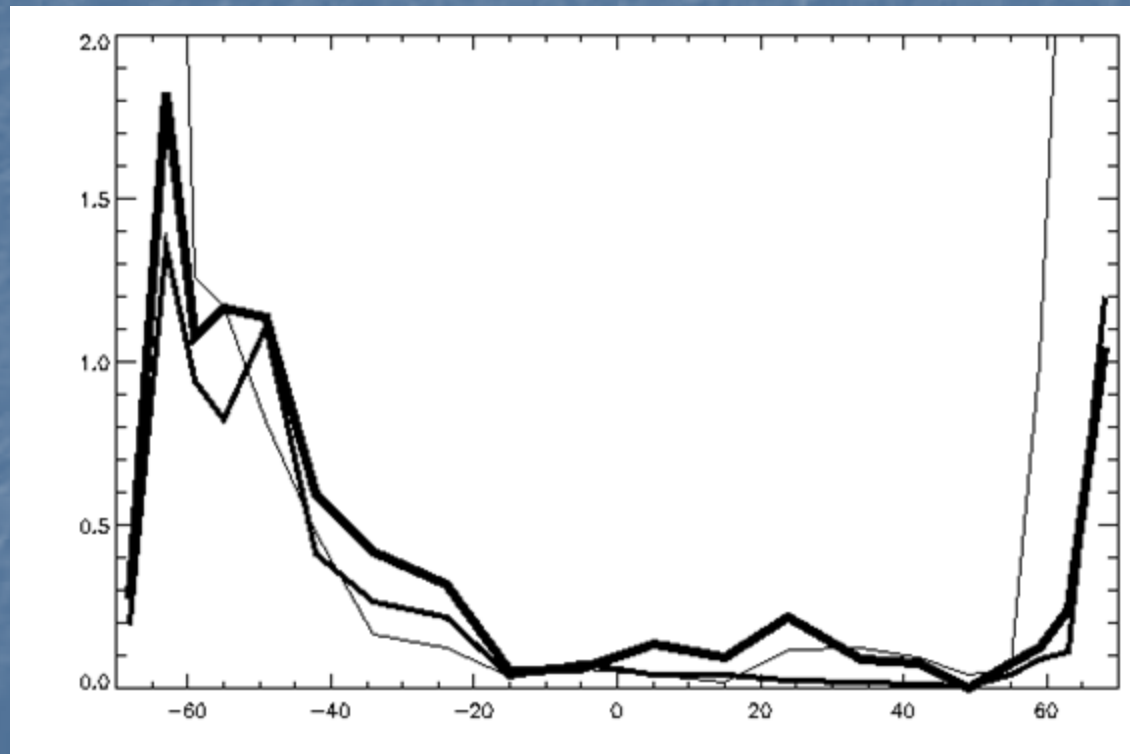
Commission Errors in Snow Retrieval



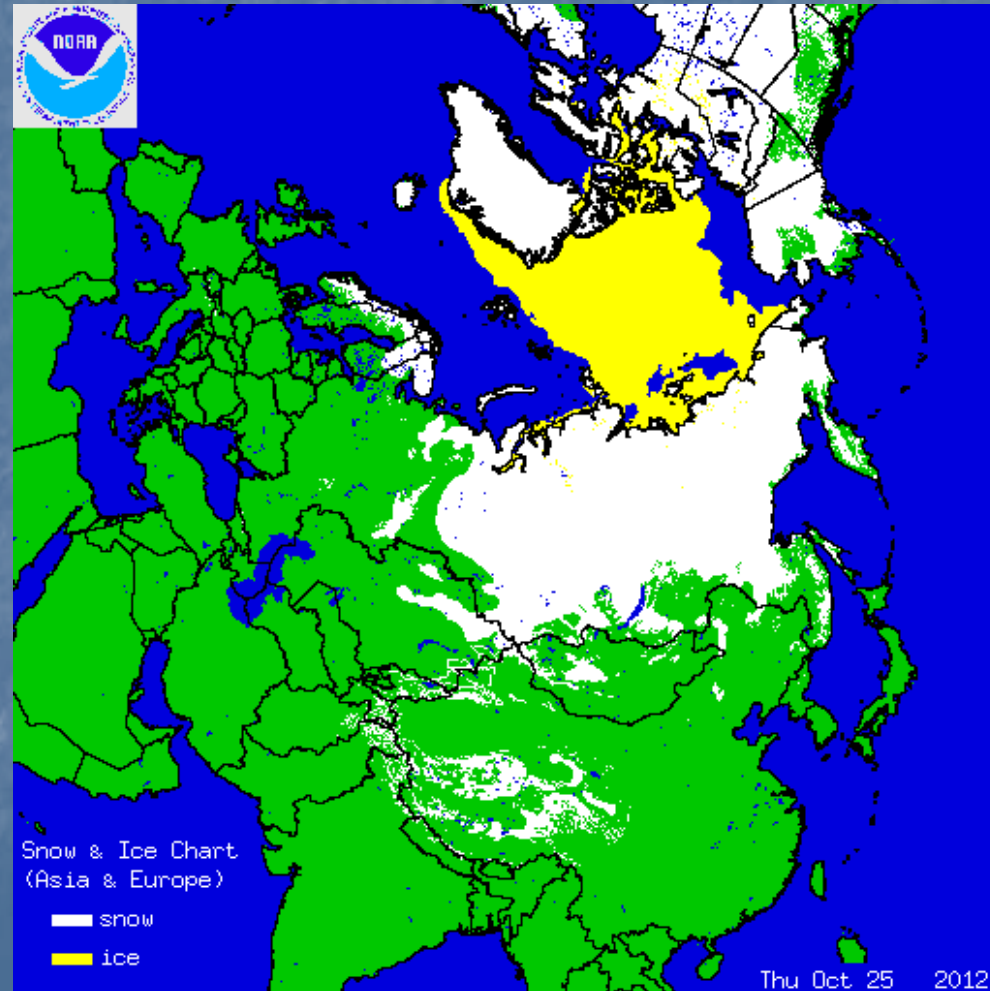
Commission Errors for different Latitudes



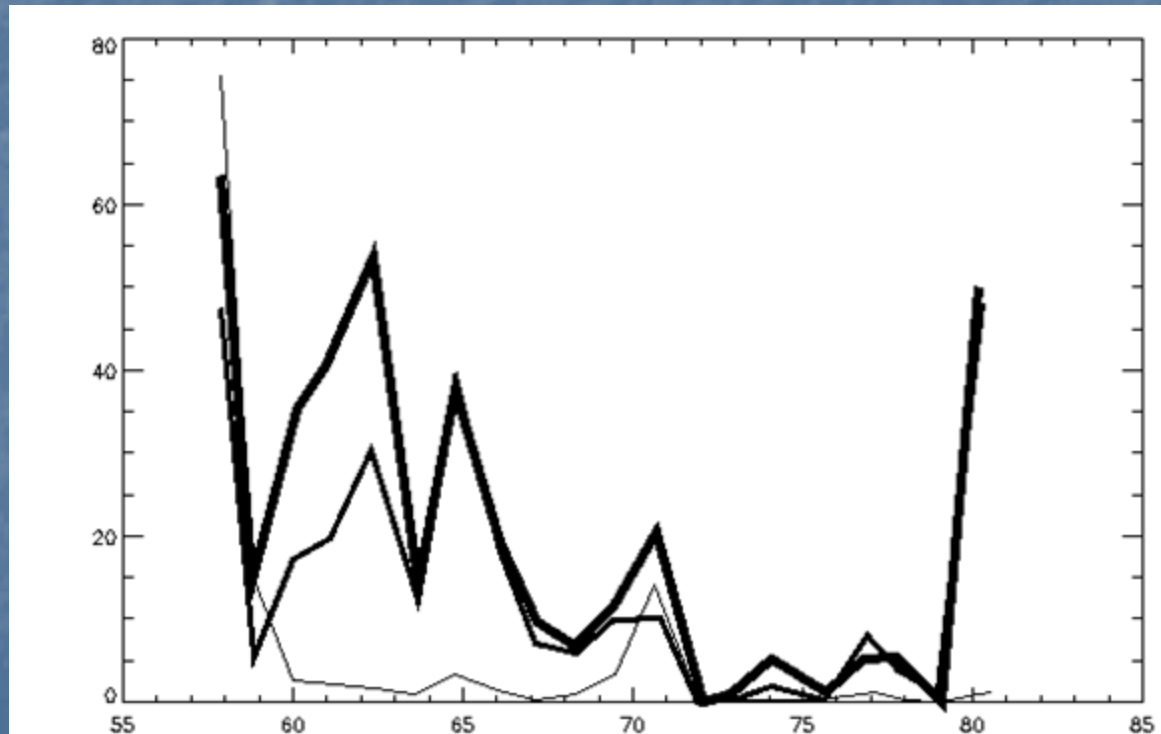
Commission Errors Depending on Scan Angles



Siberia – the Region of the Latest Tests



Omission Errors for Different Latitudes



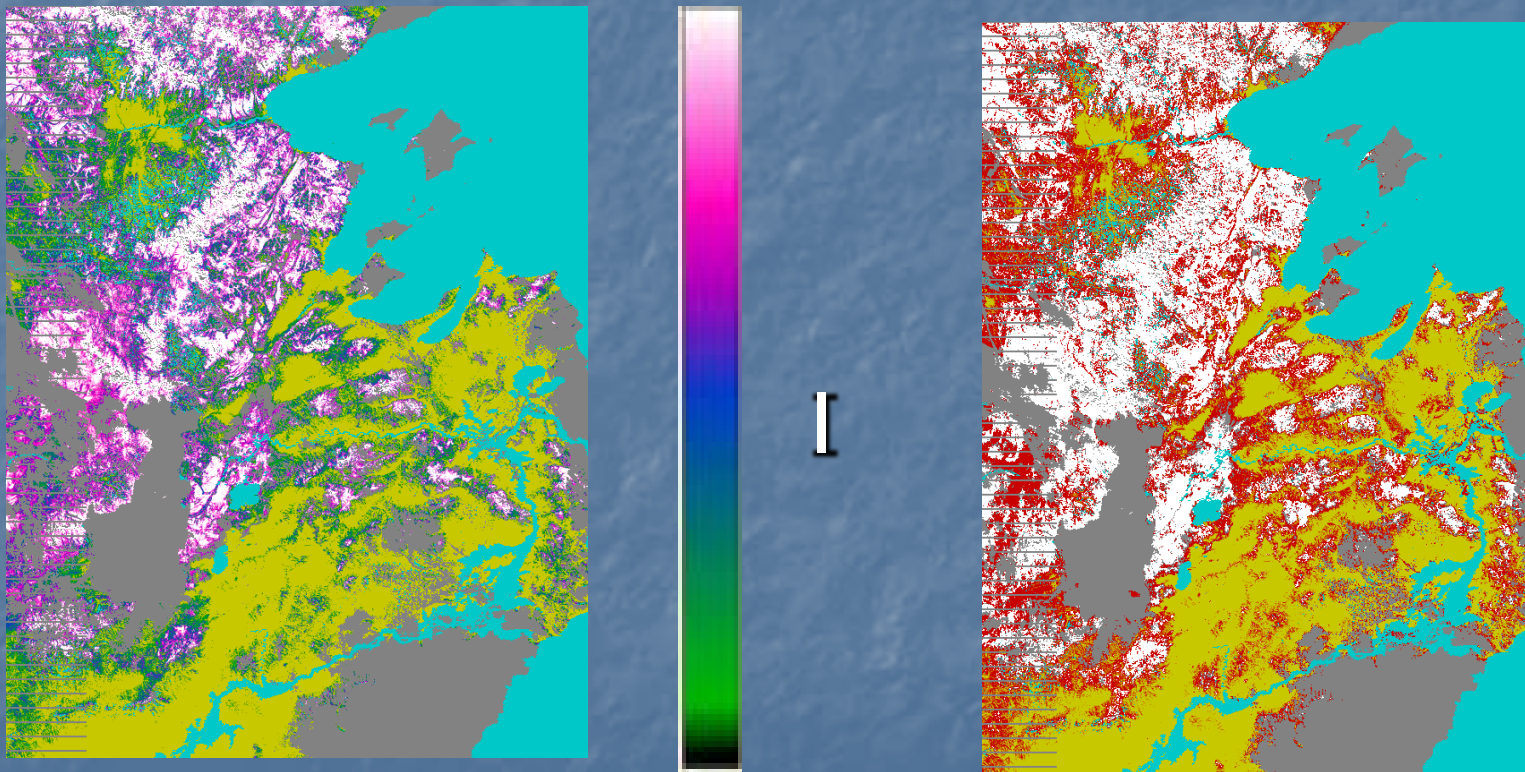
Probability of Different Cloud Confidences

Date	Time	Confidently clear	Probably clear	Probably cloudy	Confidently cloudy
297	03:20	28	3	1	26
298	03:00	36	4	1	29
299	06:05	16	1	0.4	42
300	04:05	15	0.9	0.6	31
301	03:45	18	3	1	32
302	03:25	29	4	1	35
303	06:30	8	2	1	44
304	04:30	10	1	0.5	31
Average		20	2	1	34

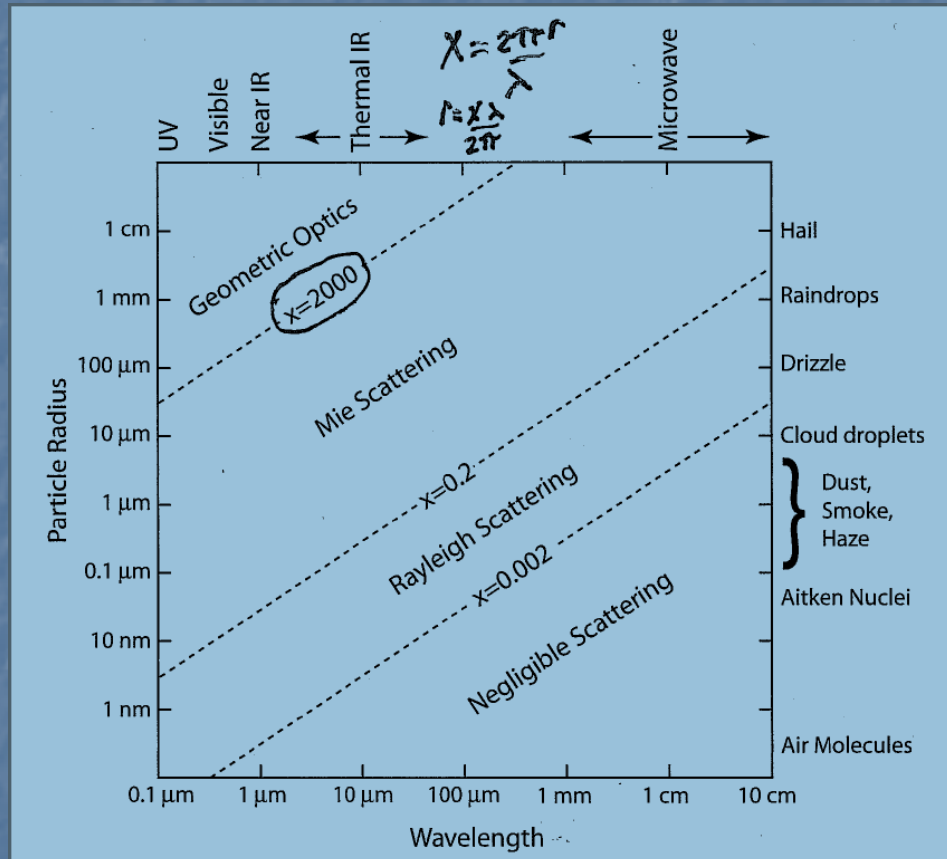
Omission Errors for Different Cloud Confidences

Day	Time	Confidently clear	Probably clear	Probably cloudy	Weighted average
297	03:20	18	85	91	26
298	03:00	13	84	81	21
299	06:05	7	34	43	8
300	04:05	8	69	69	13
301	03:45	19	61	69	27
302	03:25	21	55	40	25
303	06:30	16	17	16	16
304	04:30	7	13	14	8
Average		14	52	53	18

Advantage of Using Fractional Snow Cover



Scattering Regimes



Simple semianalytical solution instead of radiative transfer codes

- Relatively new approach
- Special asymptotic solution
- Formula for bidirectional reflectance and albedo
- Analytical algorithms for retrieval of snow properties

Resulting equation for reflection fraction

$$R_0 = F(P(\theta))$$

$P(\theta)$ – phase function (very important)

Where K_0 – the escape function approximated as

$$K_0(\xi) = (3/7)(1 + 2\cos(\xi))$$

And fraction of absorbed energy (λ)

$$\alpha = 4\sqrt{(1 - \omega) / 3(1 - g)}$$

Reflection function = $\Phi(\omega, g, P(\theta))$

Reflection Ratio

