



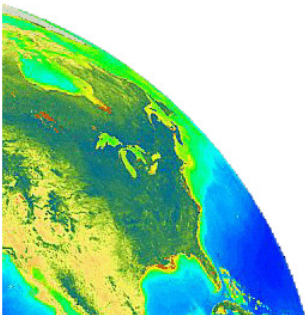
# Recent Calibration Issues with SNPP VIIRS and MODIS Aqua

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OBPG (Ocean Biology Processing Group)  
NASA Goddard Space Flight Center, Code 616

December 3rd, 2013

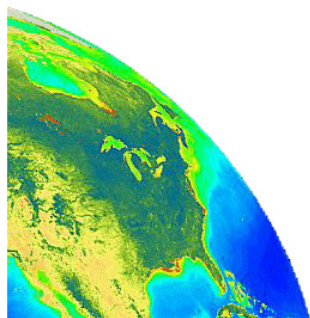
Presentation at workshop 'Satellite Instrument Pre- and Post-Launch Calibration II'  
Frascati, Italy



## Overview:

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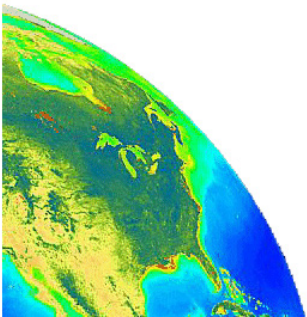
- MODIS Aqua uses solar diffuser, lunar, and desert measurements for L1B calibration (MCST)
- OBPG applies crosscalibration of MODISA to itself (mainly corrects edges of scan)
- SNPP VIIRS L1B calibration based solely on solar diffuser
- Lunar measurements show good agreement to solar diffuser
- Ocean color products (Chl., Rrs) show stable global trends for MODIS Aqua, significant decreases for VIIRS in 2013
- This is a recent result, we are still investigating



# Temporal trending for MODISA:

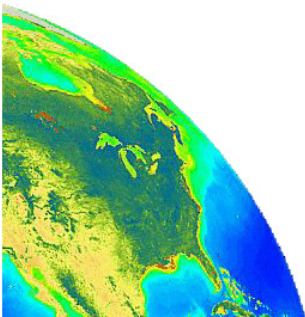
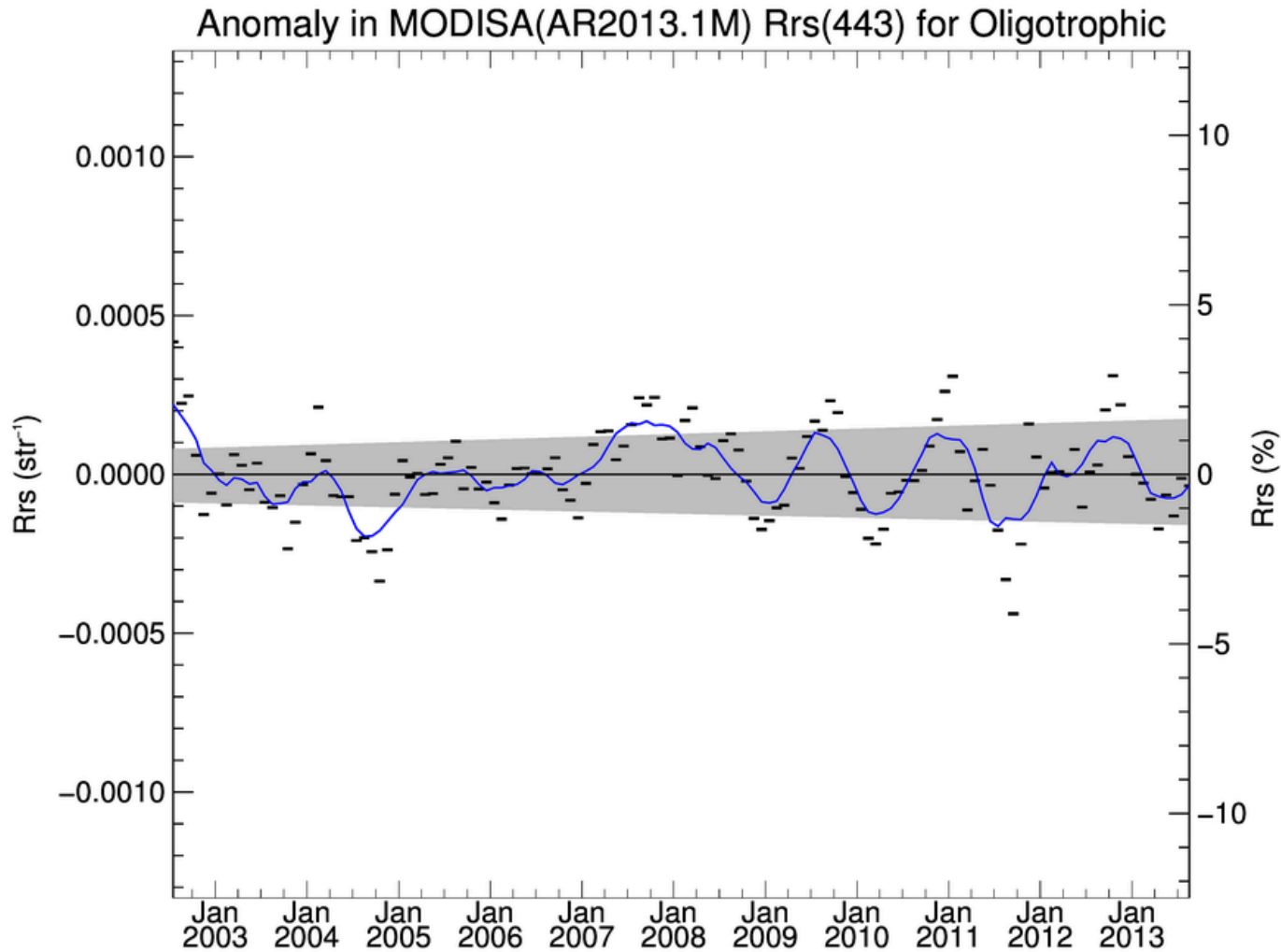
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- Based on lunar plus solar diffuser measurements for bands >443nm (scan angle dependent)
- Based on lunar plus desert trending for bands 412nm and 443nm
- For all bands (except for NIR): additional crosscalibration of MODIS Aqua to itself is applied using central area of the scan (frames 300-1050)
- MODIS Aqua is in its 11<sup>th</sup> year of on-orbit operation, beyond its designed lifetime (fuel available until ~2020)
- None of the above issues are ideal from a calibration perspective



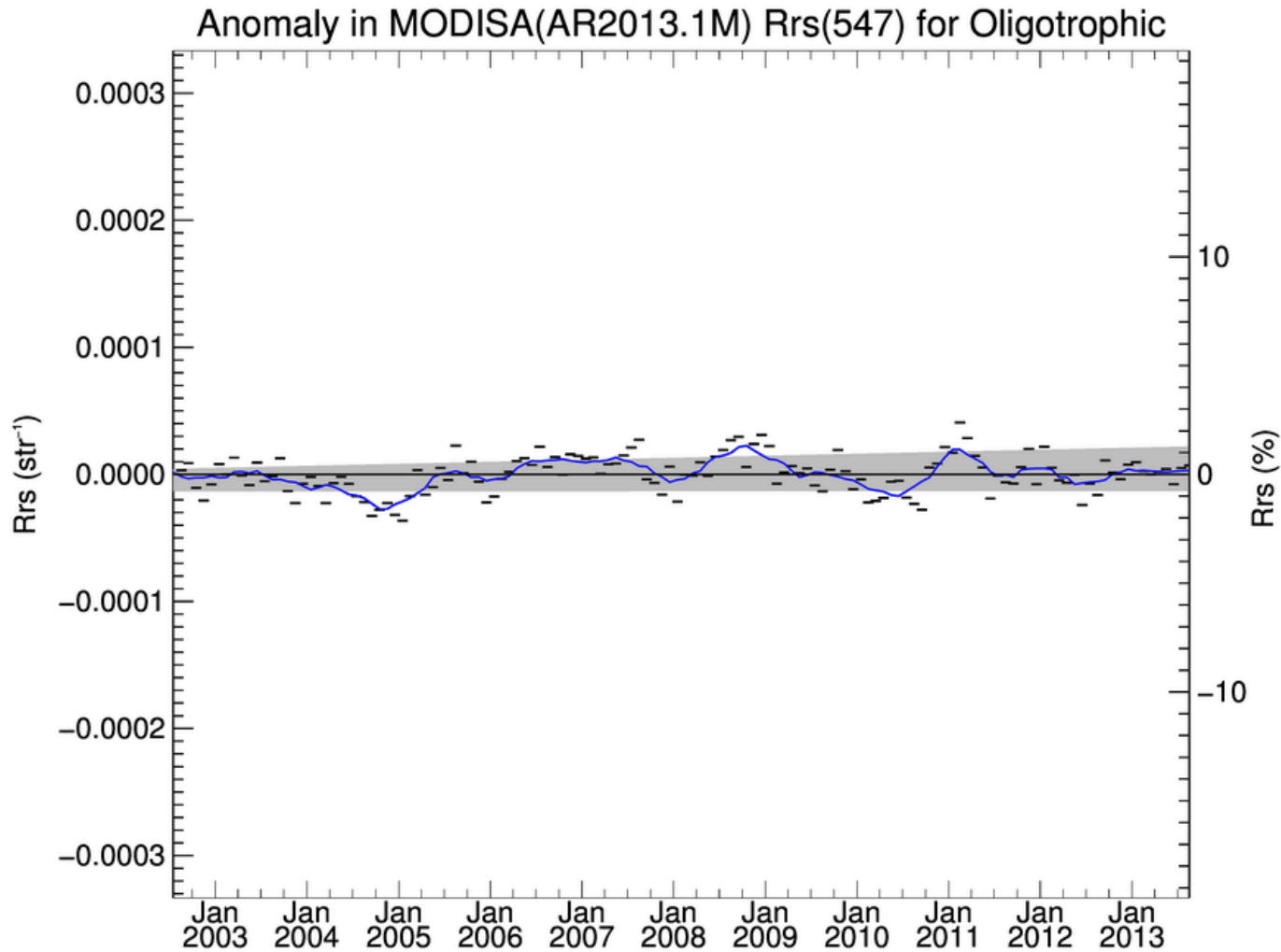
# Global trending of ocean color products for MODISA

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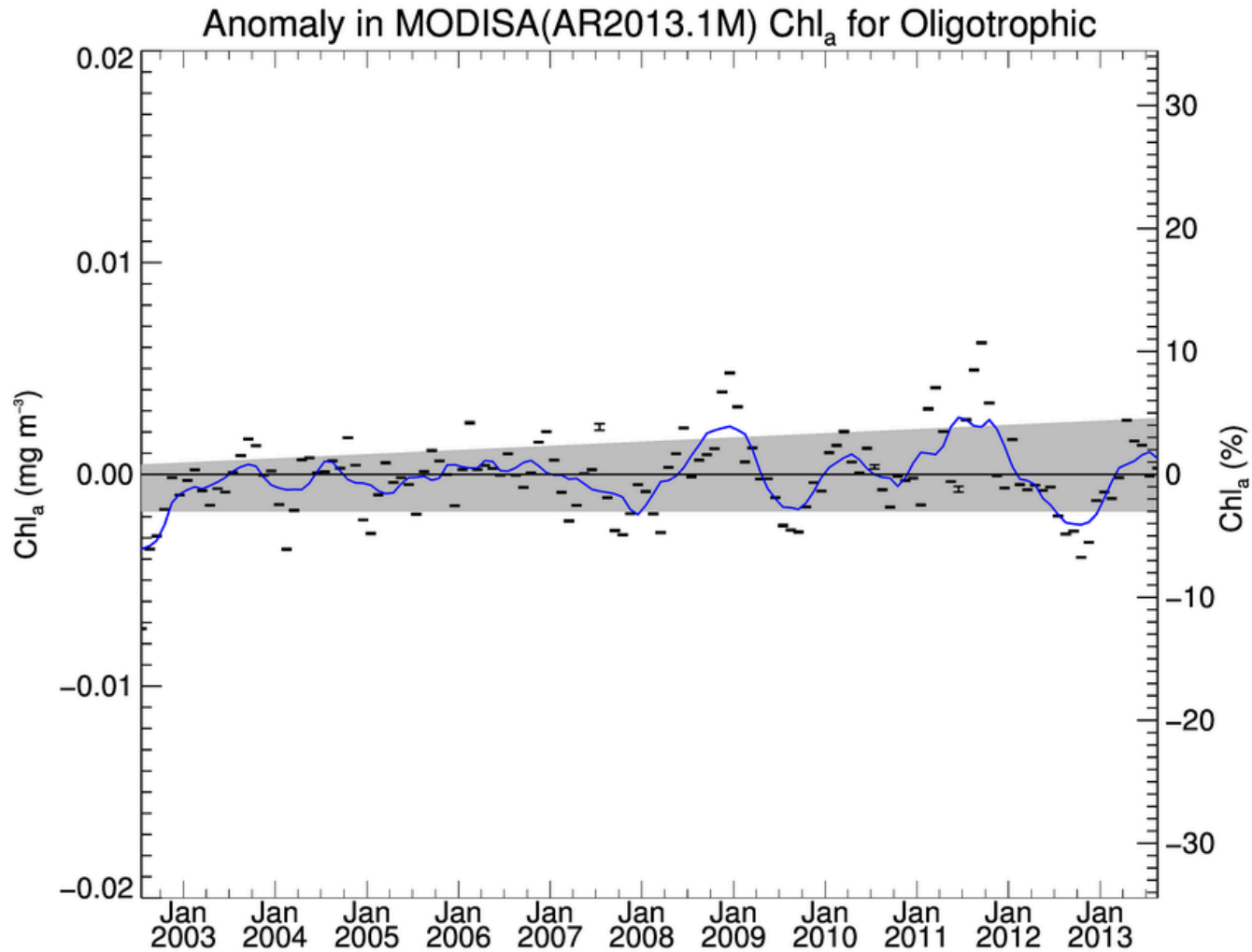
# Global trending of ocean color products for MODISA

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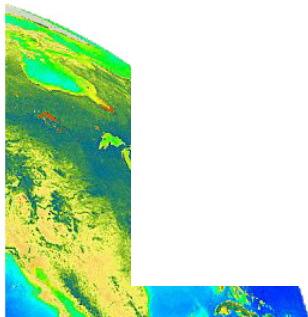
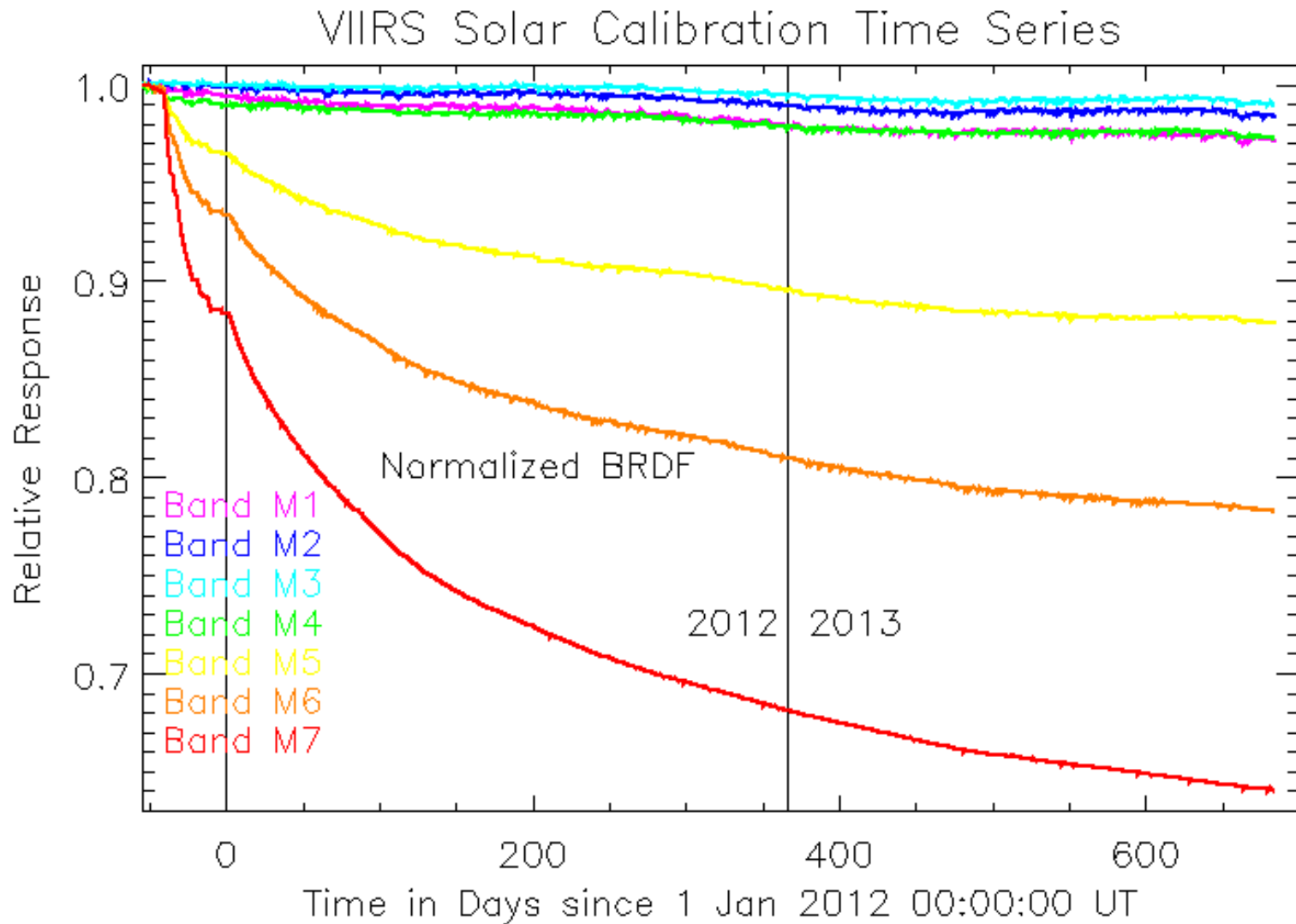


# Global trending of ocean color products for MODISA

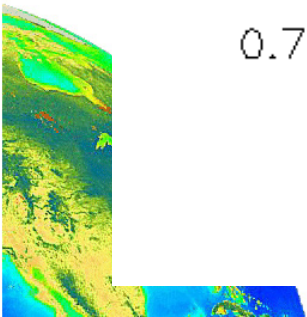
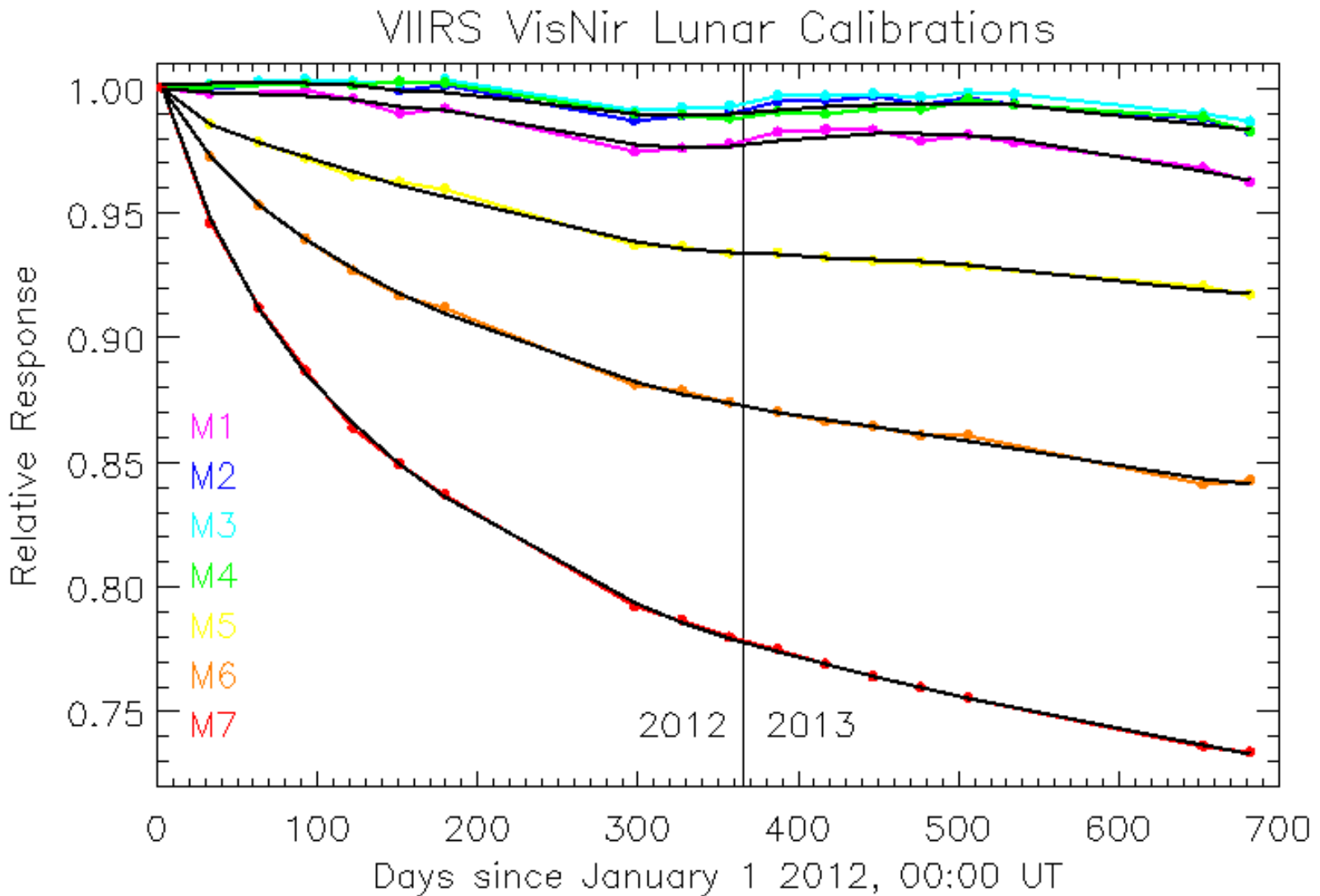
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# Temporal trending for VIIRS: solar diffuser

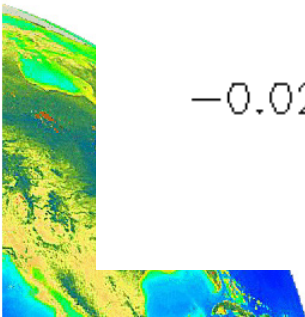
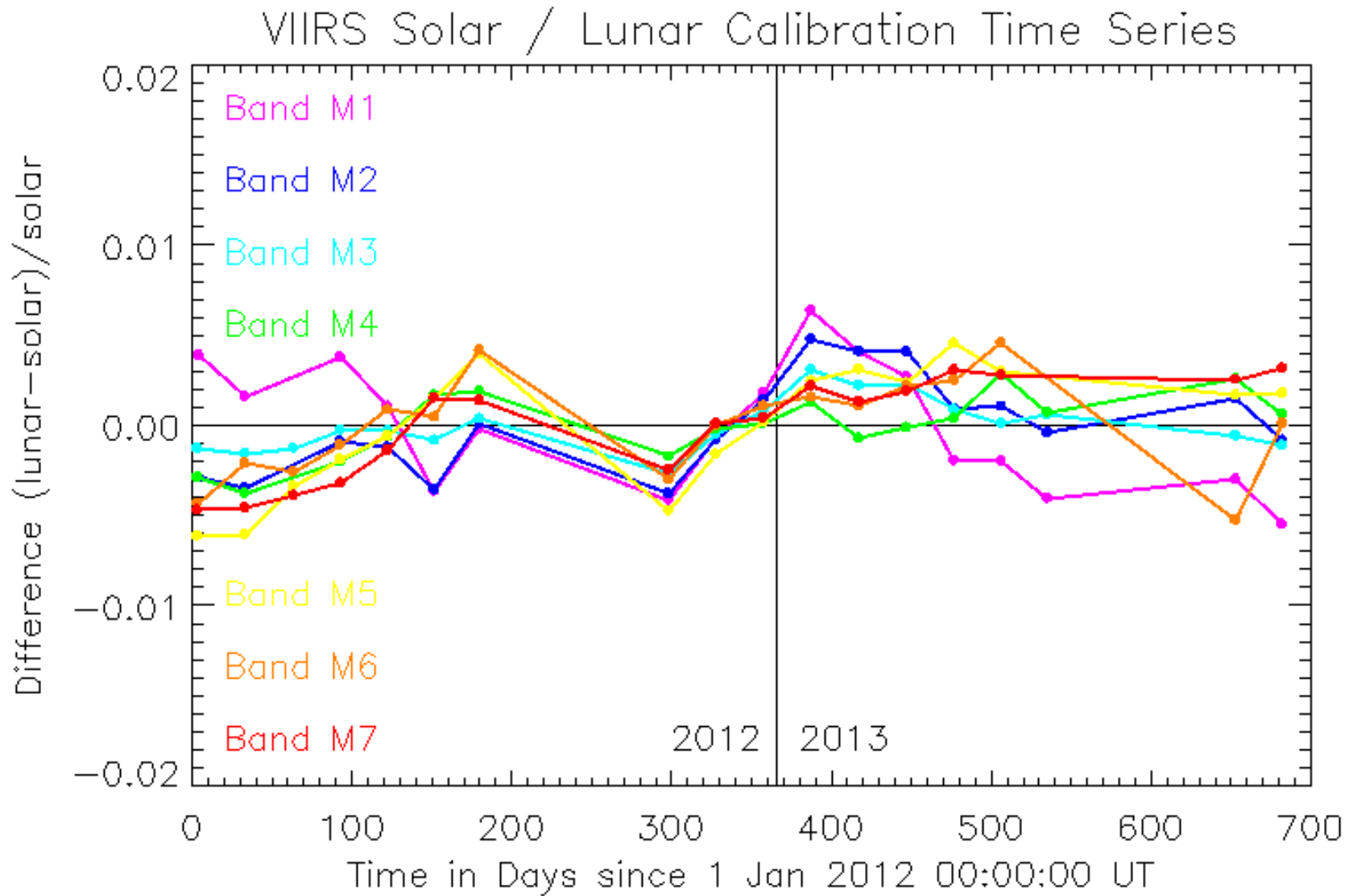


# Temporal trending for VIIRS: lunar



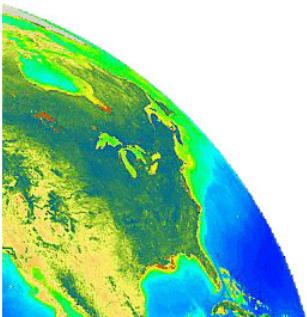
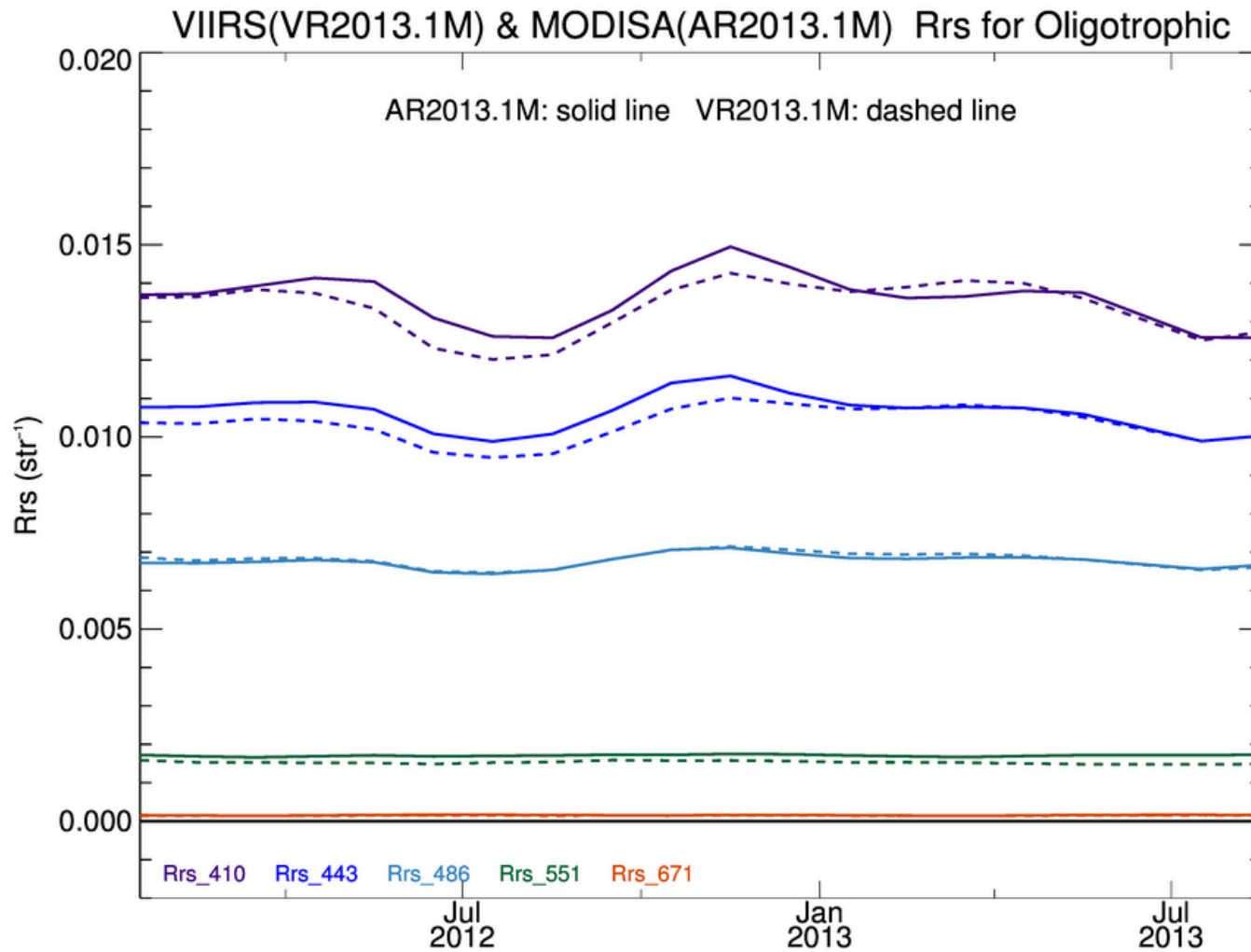


# Temporal trending for VIIRS: lunar/solar residuals



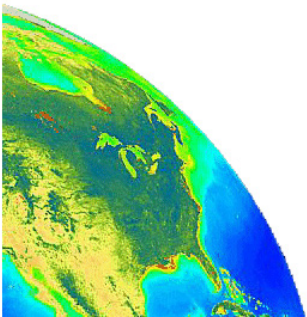
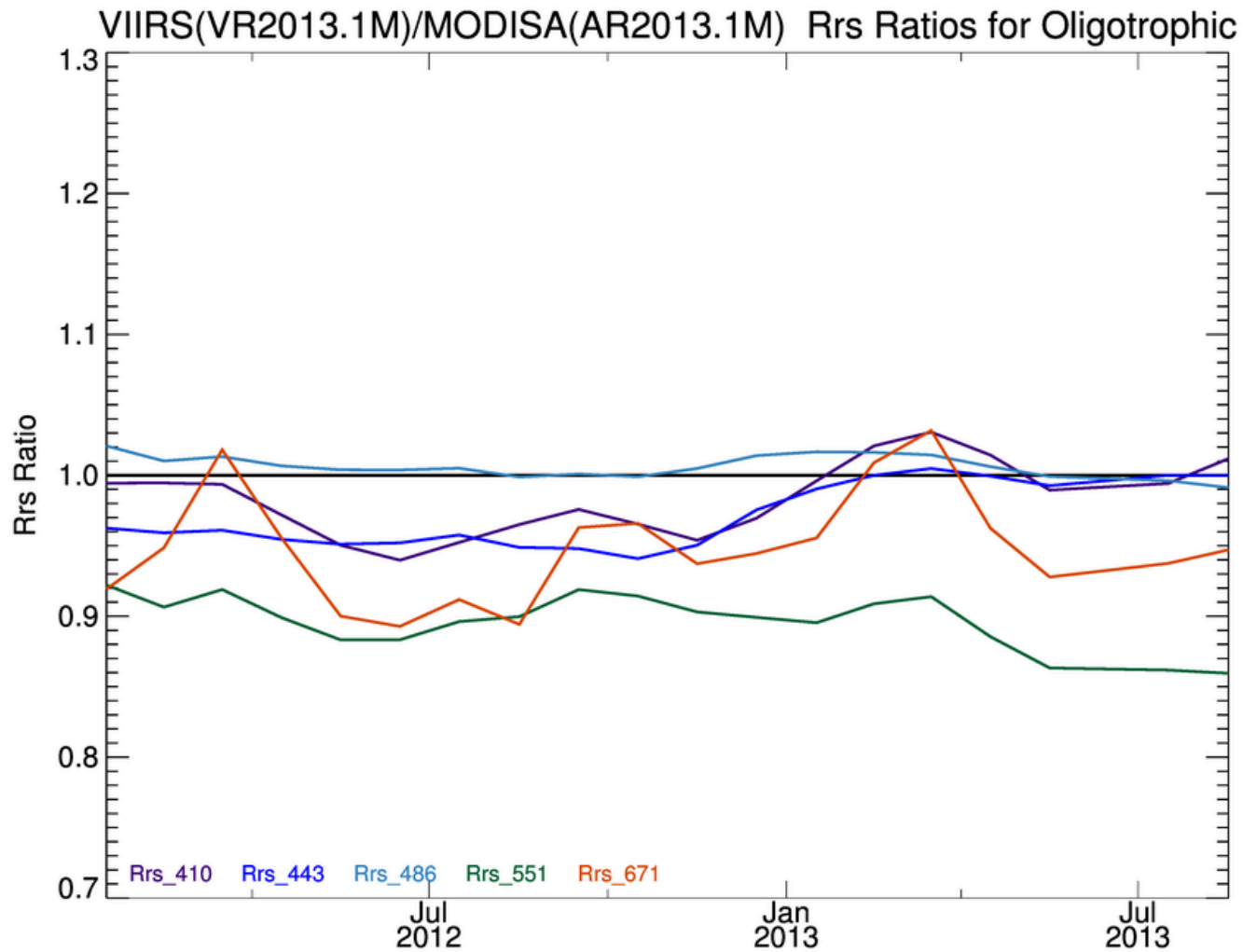
# Global (olig.) trending of Rrs: MODISA & VIIRS (solar)

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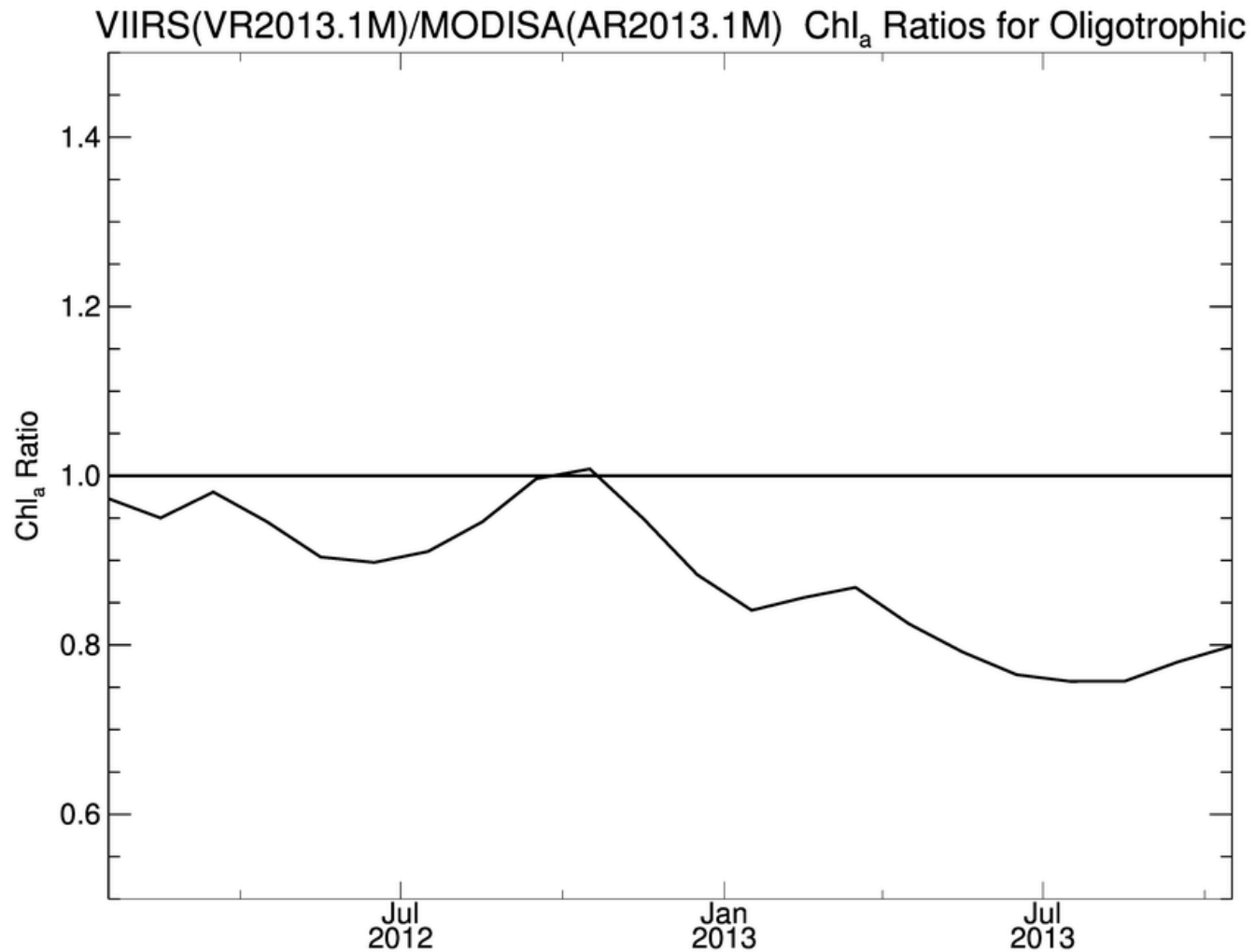
# Global (olig.) trending of Rrs: VIIRS(solar)/MODISA

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# Global (olig.) trending of Chl.: VIIRS(solar)/MODISA

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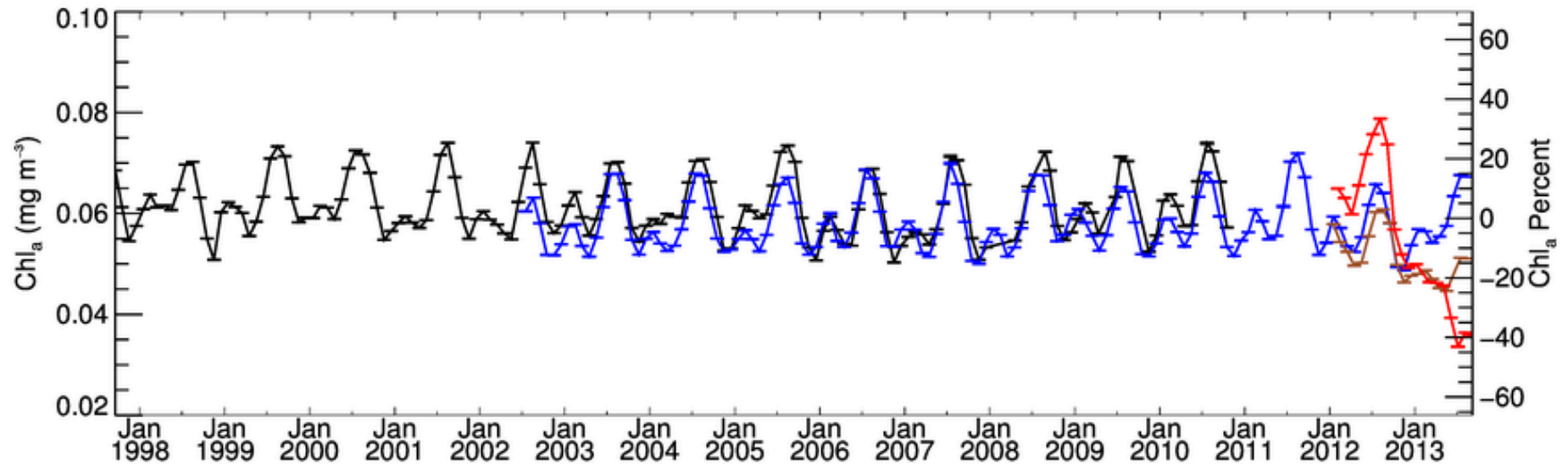


15-20% decrease

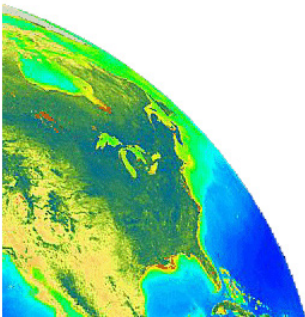


# Global trending of Chl. In Oligotrophic waters:

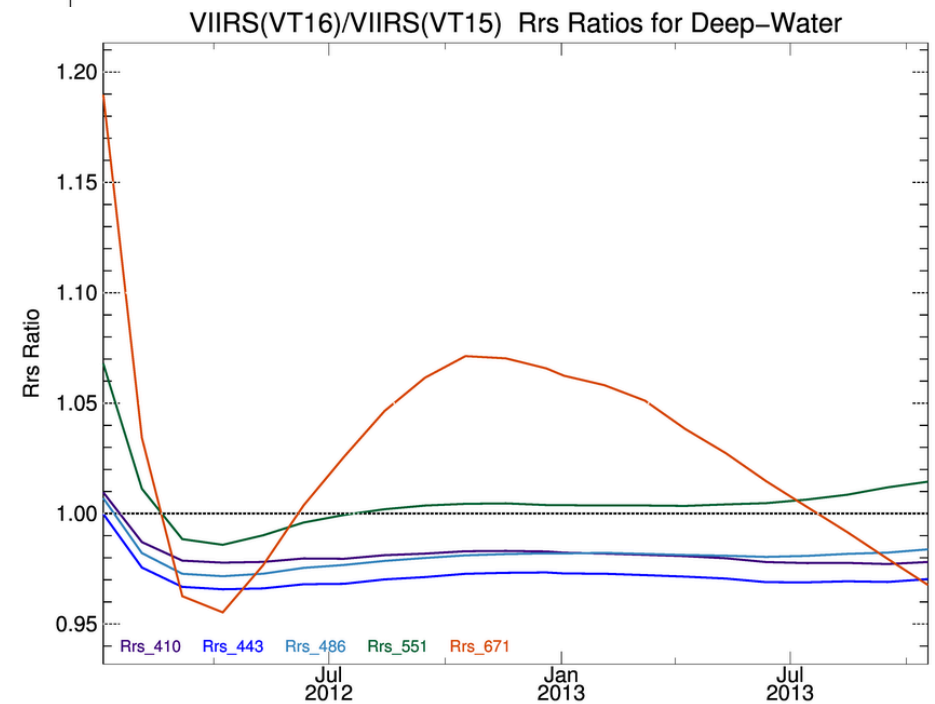
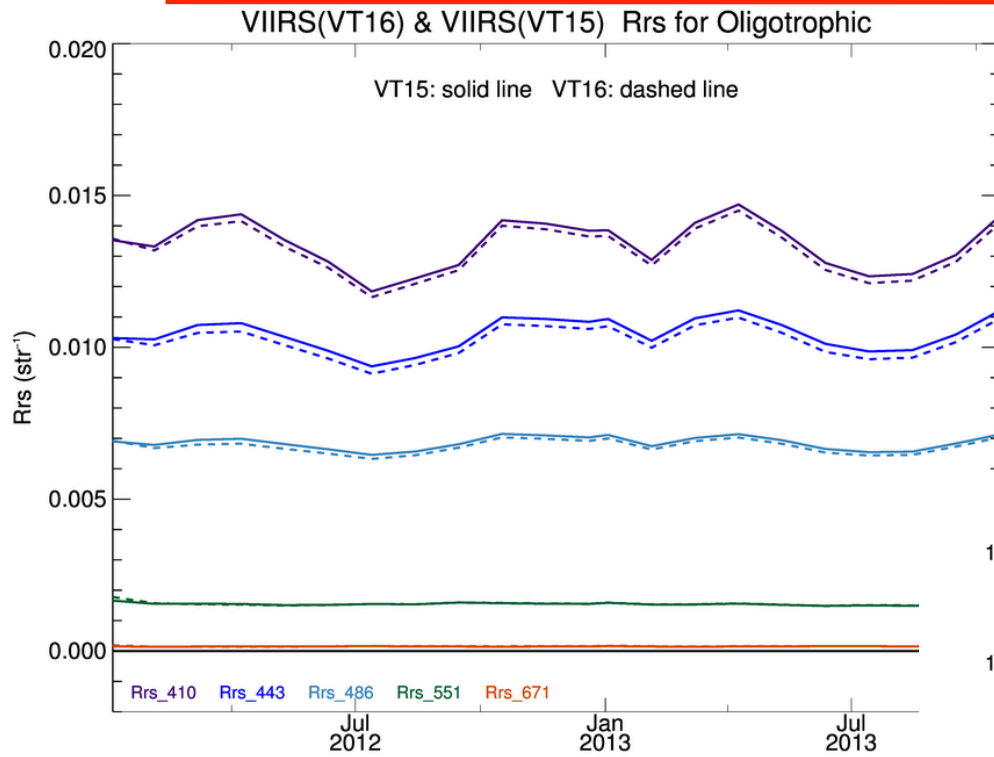
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SeaWiFS, MODISA, VIIRS (NASA, solar), VIIRS (NOAA/IDPS)

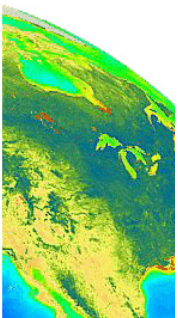
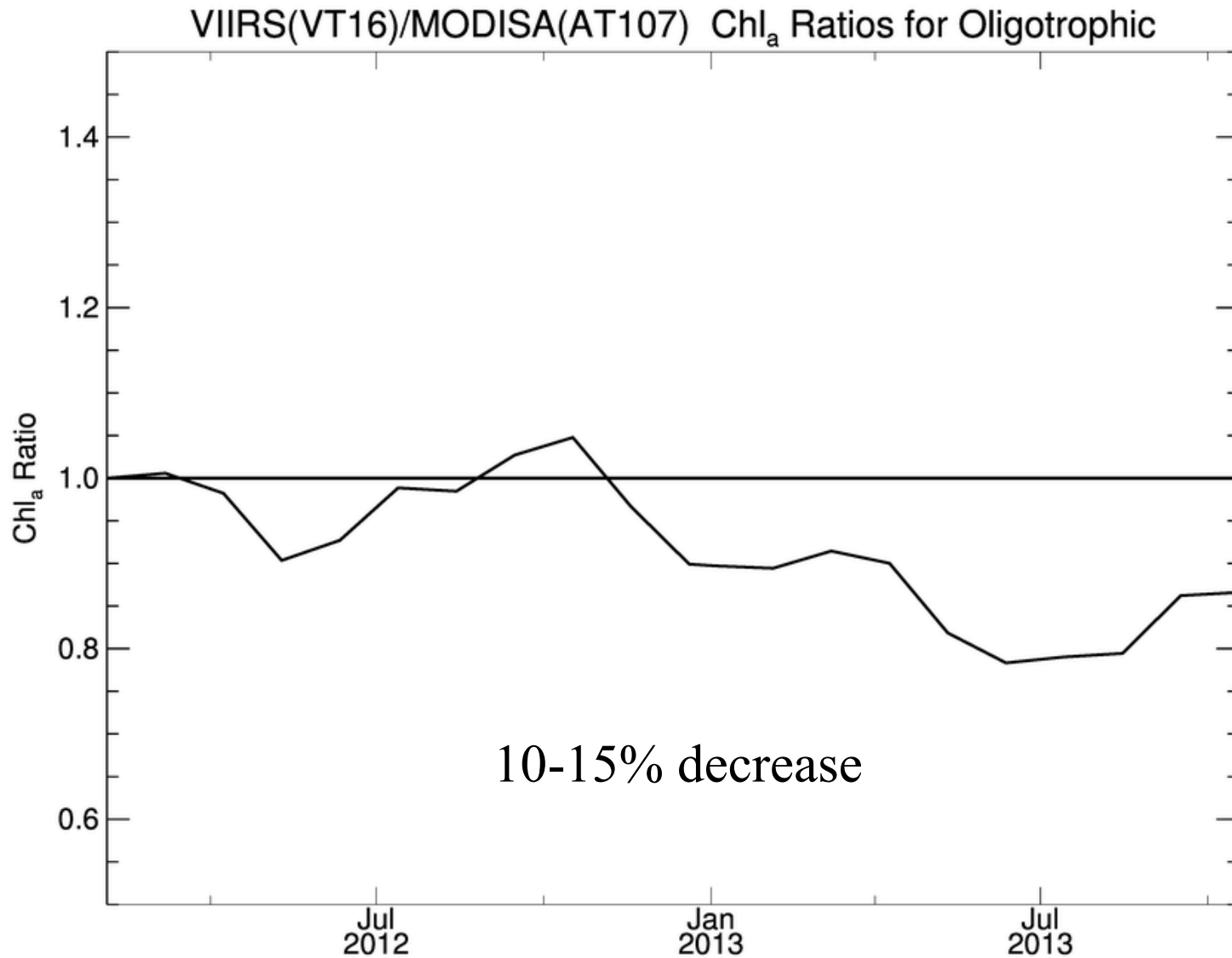


# Global (olig.) trending of Rrs: Solar vs lunar



# Global (olig.) trending of Chl: VIIRS(lunar)/MODISA

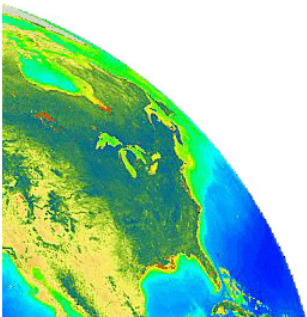
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# Conclusions

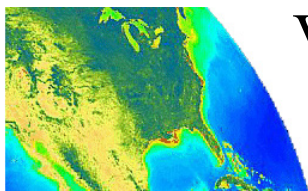
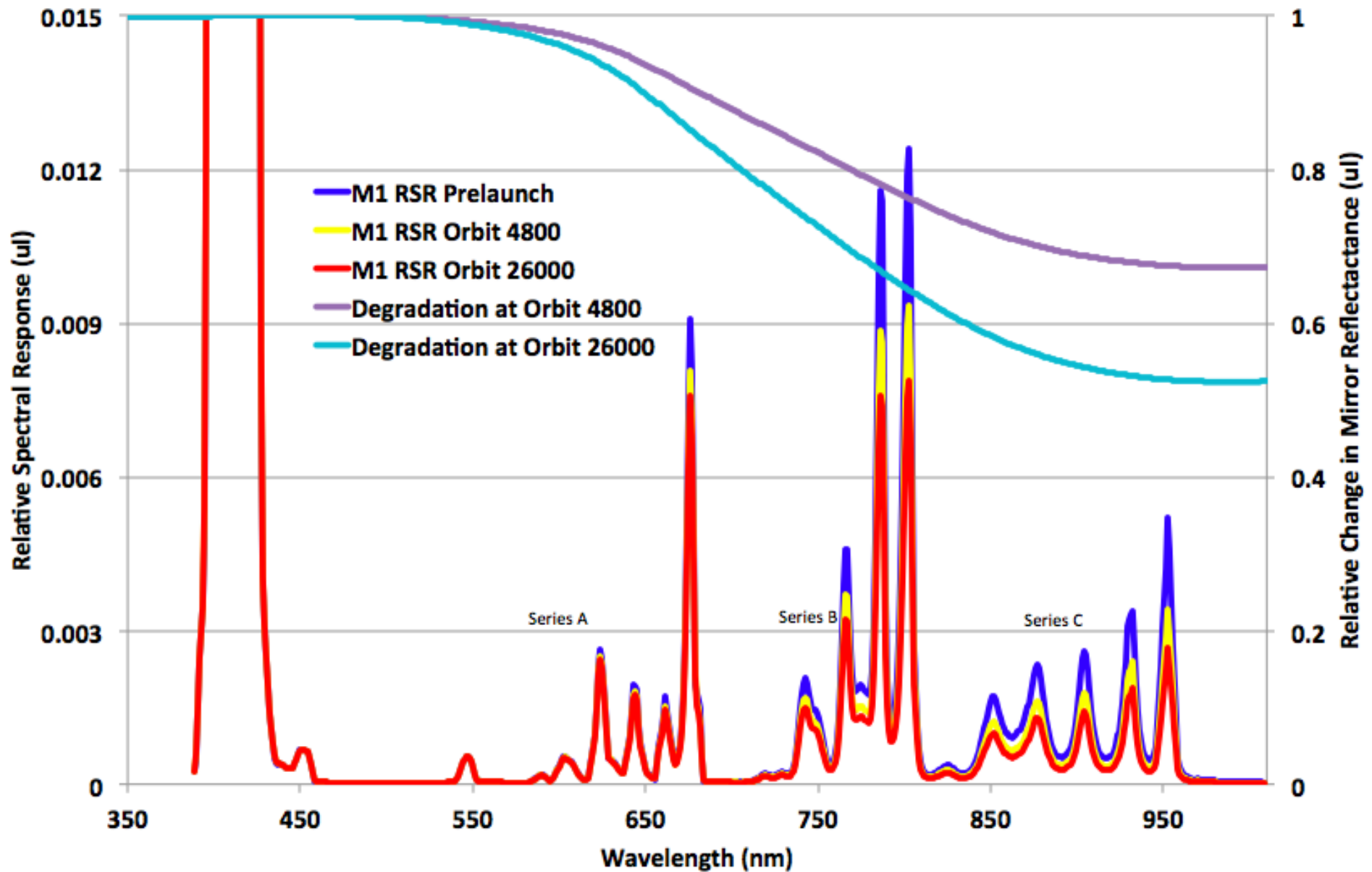
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- VIIRS Chl. Product in olig. Waters is trending downward by ~15% for both solar and lunar calibration (NASA processing)
- No significant trend in MODIS Aqua Chl. Product
- No explanation yet. Current best guess for root cause: spectral response change due to tungsten contamination on VIIRS mirrors
- VIIRS Chl. Product is trending downward even stronger (>50%) for IDPS (NOAA) processing. Most likely due to inconsistent processing.





# M1 "Fused" Relative Spectral Response (Version 3)



VIIRS modeled degradation due to Tungsten contamination

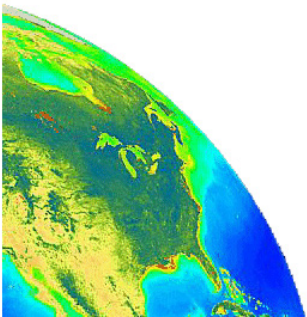
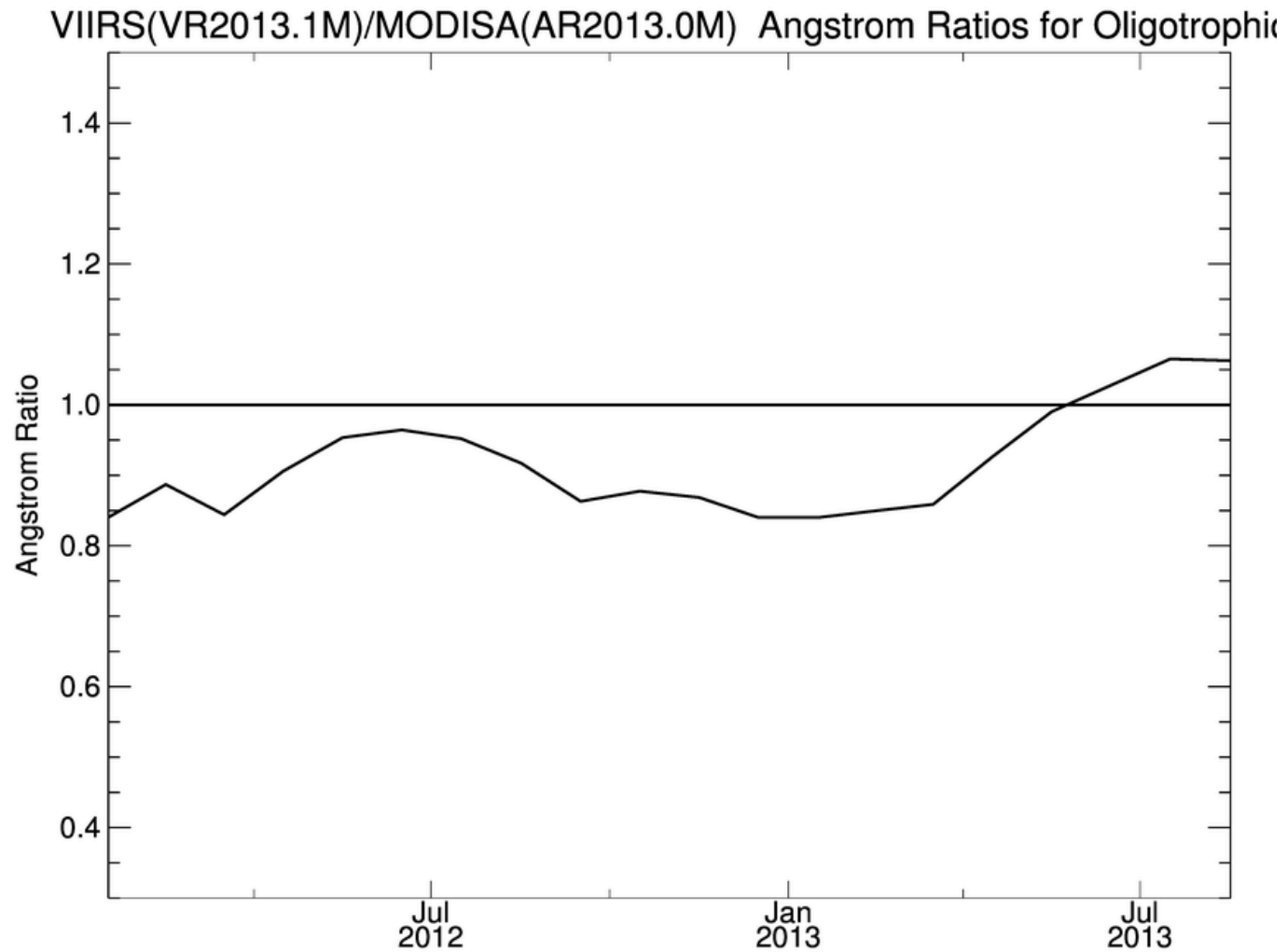
# Backup slides

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# Global (olig.) trending of Angstrom: VIIRS/MODISA

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# Global (olig.) trending of Angstrom: VIIRS,MODISA

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