

A Monte-Carlo based approach for estimating remote sensing reflectance uncertainty

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Objectives

- Implement sensor-dependent noise model
- Quantify noise propagation due to atmospheric correction.
- Generate remote sensing reflectance (R_{rs}) uncertainty product.

Introduction

- Ocean color missions subject to pre-specified uncertainty requirements.
- Typical uncertainty estimation uses problematic comparison with in-situ data;
 - in-situ data sampling is potentially biased to easily accessible areas[1],
 - difficult to separate noise from in-situ and satellite measurements[2]
 - differences in sampling scale also confounding.[3]

Methods

- Model signal-to-noise Ratio (SNR) as a function of top-of-the-atmosphere radiance (L_t)
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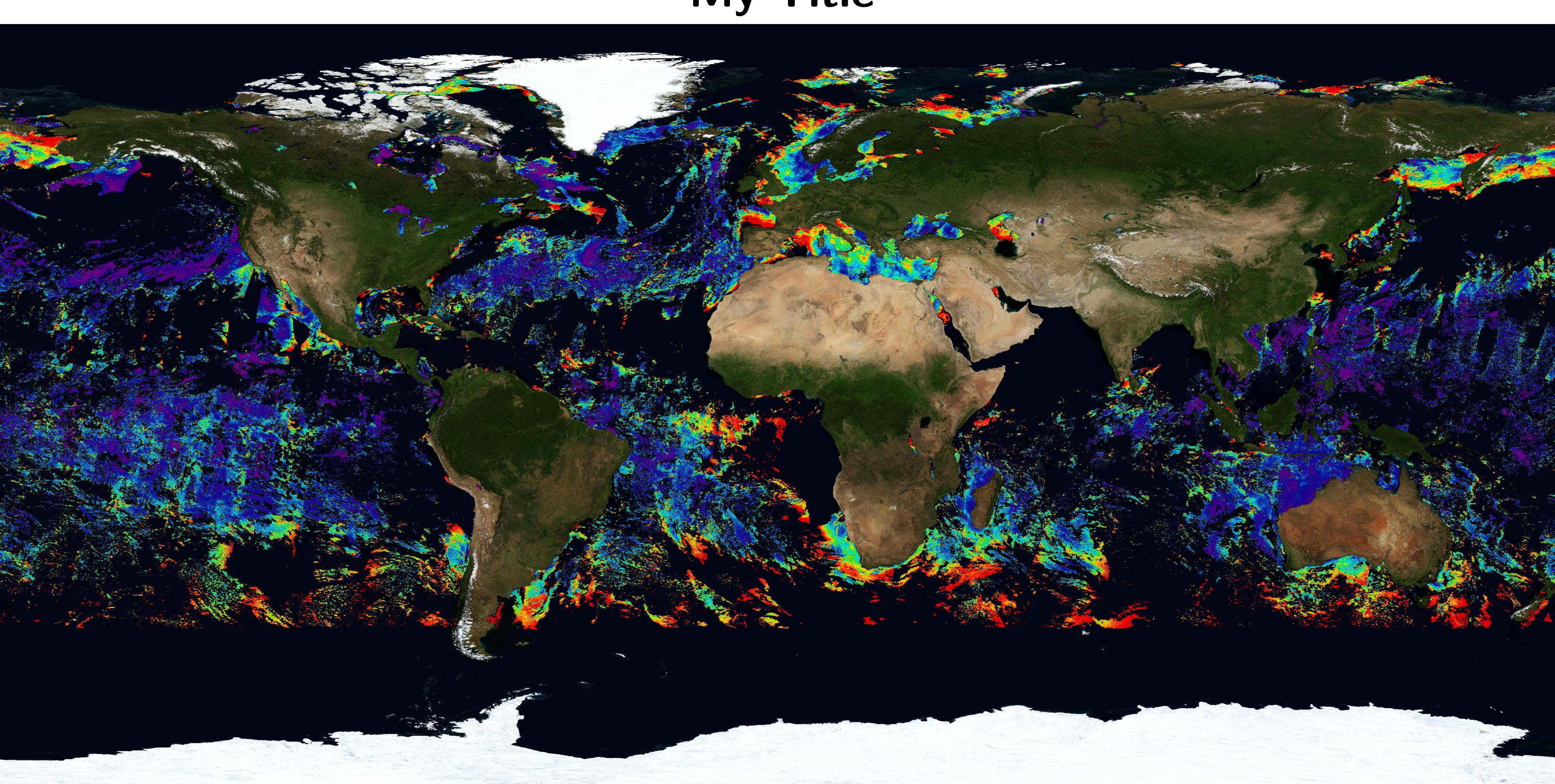
Results

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Nunc tempus venenatis facilisis. Curabitur suscipit consequat eros non porttitor. Sed a massa dolor, id ornare enim

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Nunc tempus venenatis facilisis. Curabitur suscipit consequat eros non porttitor. Sed a massa dolor, id ornare enim

Next Steps

- Extend MC simulations to other sensors.
- MC simulations computationally costly;
 - Finding an alternative to build on this work, a priority
 - Develop machine learning (ML) approach (e.g. neural network);
 - Identify uncertainty drivers in MC as potential inputs to ML;
 - Use ML to shorten uncertainty product generation to one run.

References

- [1] S. Bailey and P. Werdell, "A multi-sensor approach for the on-orbit validation of ocean color satellite data products," *REMOTE SENSING OF ENVIRONMENT*, vol. 102, no. 1-2, pp. 12–23, 2006.
- [2] D. Toole, D. Siegel, D. Menzies, M. Neumann, and R. Smith, "Remote-sensing reflectance determinations in the coastal ocean environment: impact of instrumental characteristics and environmental variability," *APPLIED OPTICS*, vol. 39, no. 3, pp. 456–469, 2000.
- [3] C. Hu, L. Feng, and Z. Lee, "Uncertainties of seawifs and modis remote sensing reflectance: Implications from clear water measurements," *REMOTE SENSING OF ENVIRONMENT*, vol. 133, pp. 168–182, 2013.

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