**Abstract**

Atmospheric transport of dust is considered to be a major source of iron (Fe) to the open oceans. Fe supply may play a key role in regulating ocean productivity, the atmospheric CO₂ and climate (Martin et al., 1990). Supply of micronutrient Fe is particularly important for high-nitrate low-chlorophyll (HNLC) waters of the Southern Ocean (Watson et al., 2000). Understanding the biogeochemical cycling of Fe in both present and past climate and the role of mineral dust in Fe-mediated carbon sequestration in the Southern Ocean is one of the most outstanding issues in climate science today. Patagonia is considered to be one of the most important suppliers of dust laden Fe to the surface waters of the Southern Ocean (Gaiero et al., 2003). However, only a small fraction of this mineral-Fe is available for oceanic biota (Wu et al., 2001). Therefore, in this study we address the following question: What is the magnitude and spatial variability of bioavailable Fe fluxes to the South Atlantic Ocean downstream from Patagonia?

**Method:** Use GEOS-Chem with implemented iron dissolution scheme (Solmon et al., 2008) to calculate dust and dissolved Fe (DFe) deposition rates in Patagonian/Southern Ocean domain.

**The Model**

GEOS-Chem (version v6-01-01) is a global transport model driven by the newest GEOS-4 meteorological fields. Using the Dust Entrainment and Deposition (DEAD) scheme the model calculates dust emission, transport, and deposition (wet and dry) on a 0.5°x0.5° grid resolution (Fairlie et al., 2006). This is the first time GEOS-Chem predicted dust mobilization and transport in Patagonia/South Atlantic domain was compared with the reported studies and local observations. Improvements made to the model prior to the simulations are:

- Implemented an iron dissolution scheme (Solmon et al., 2008) to the newest version of GEOS-Chem
- Altered dust mineralogy to represent Patagonian topsoil

**Source Location**

1. **Dust Transport Path**

   -冬季（冬）区面积平均 vs. 站点报告
   -夏季（夏）区面积平均 vs. 站点报告

2. **模型模拟和当地尘异报告**

   - 气候预测的平均尘柱浓度与观测值的比较
   - 预测的尘柱浓度与观测值的比较

3. **尘埃对比与可用结果**

   - 全年平均尘柱浓度
   - 夏季（夏）区面积平均 vs. 站点报告

4. **尘埃运输路径**

   - 2001年/2006年降水量
   - 2011年/2008年降水量

5. **尘埃沉积**

   - 2006年-2007年

6. **溶解铁沉积**

   - 气候预测的平均尘柱浓度与观测值的比较
   - 预测的尘柱浓度与观测值的比较

**Comparison Results**

- 预测了尘源分布的尘埃运移模式与实际的尘埃运移模式比较
- 预测了尘埃沉积的尘埃运移模式与实际的尘埃沉积模式比较

**Future Plans**

- 计划在2008年使用新的尘埃运移模式
- 预测了尘埃沉积的尘埃运移模式与实际的尘埃沉积模式比较
- 预测了尘埃沉积的尘埃运移模式与实际的尘埃沉积模式比较

**Acknowledgments**

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**References**

- Fairlie et al., 2004, Atmospheric transport of iron and the deposition in the Southern Ocean. BioScience, 54, 703–714
- Ramsperger et al., 2003, Altered dust mineralogy to represent Patagonian topsoil

**Patagonian Mineralogy**

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**Dissolved Iron Deposition**

- 预测的平均尘柱浓度与观测值的比较
- 预测的尘柱浓度与观测值的比较

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