

CHALLENGES TO MODELING AIR QUALITY IN THE LAKE TAHOE REGION

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ISSUES

Scales:

Vertical

Resolution for Slope Flows – 5m

Rough Terrain for Regional Transport – 100m - 2km

Free Troposphere Mixing – 5-10km

Horizontal

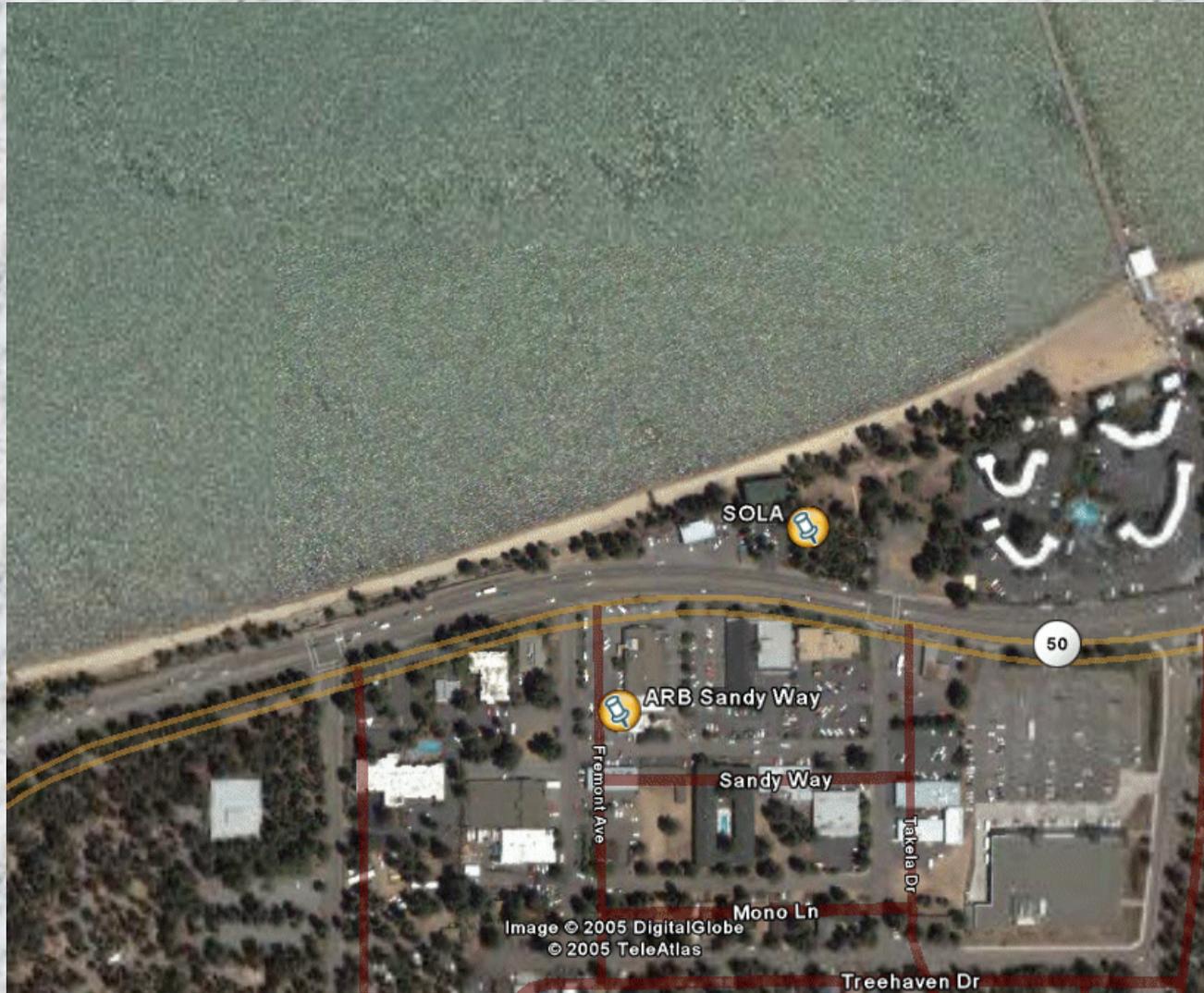
Urban & Shoreline Scale - <100m

Basin Dispersion and Mixing – 100m - 50km

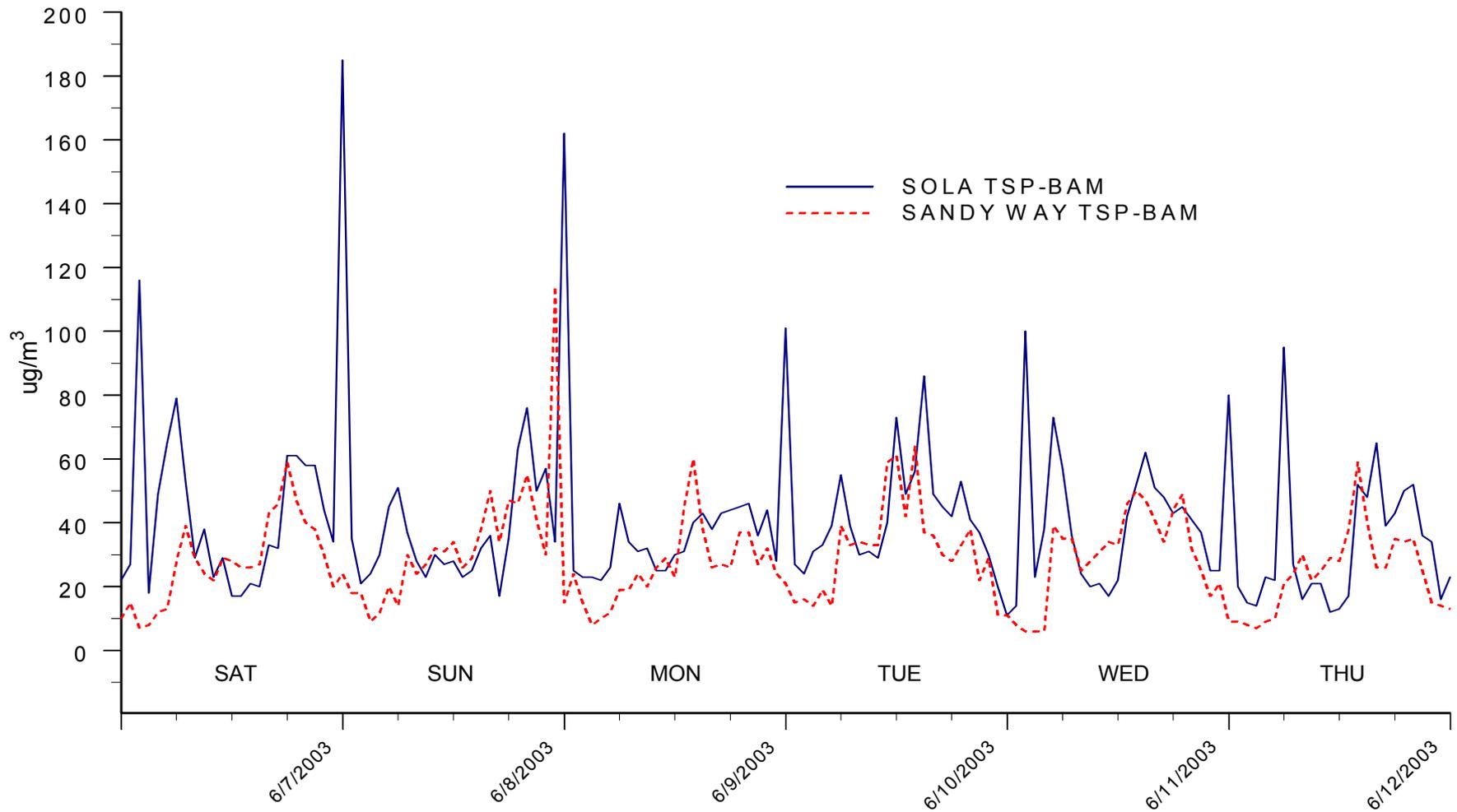
Rough Terrain for Regional Transport – <10km

Long Range Transport - >500km

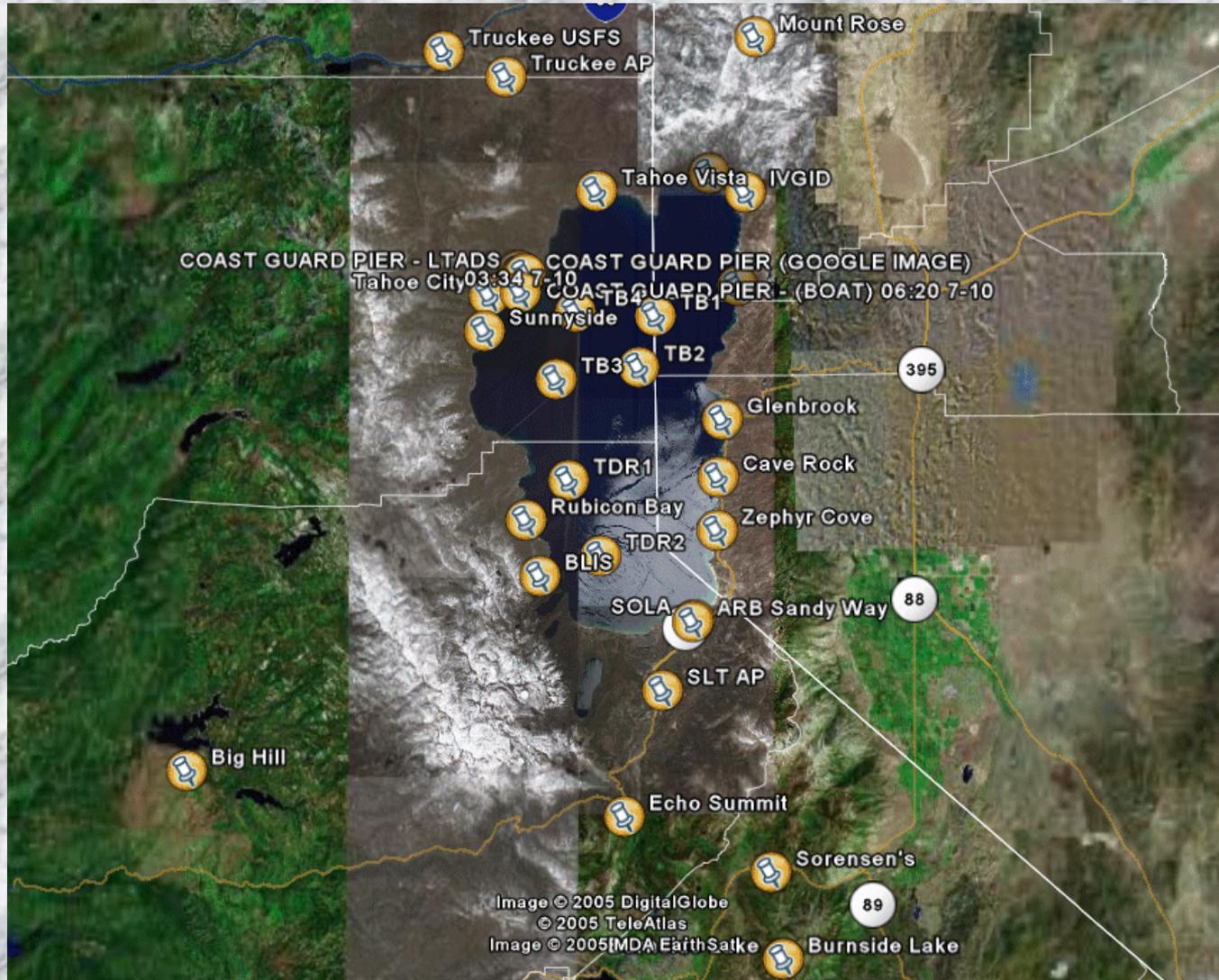
SOLA and Sandy Way



South Shore Temporal Pattern



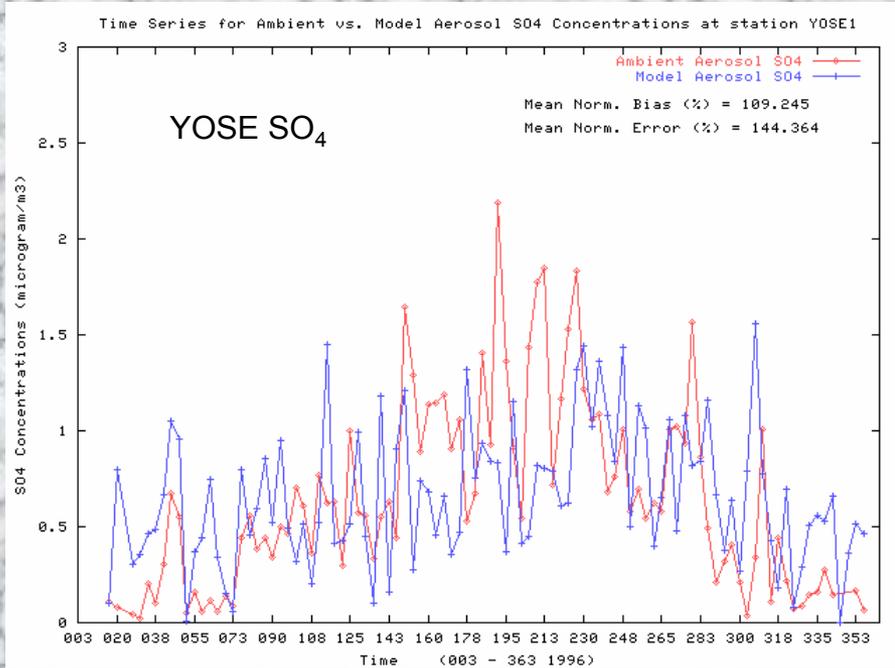
TAHOE REGION SITES



Modeling Western U.S. PM Air Quality

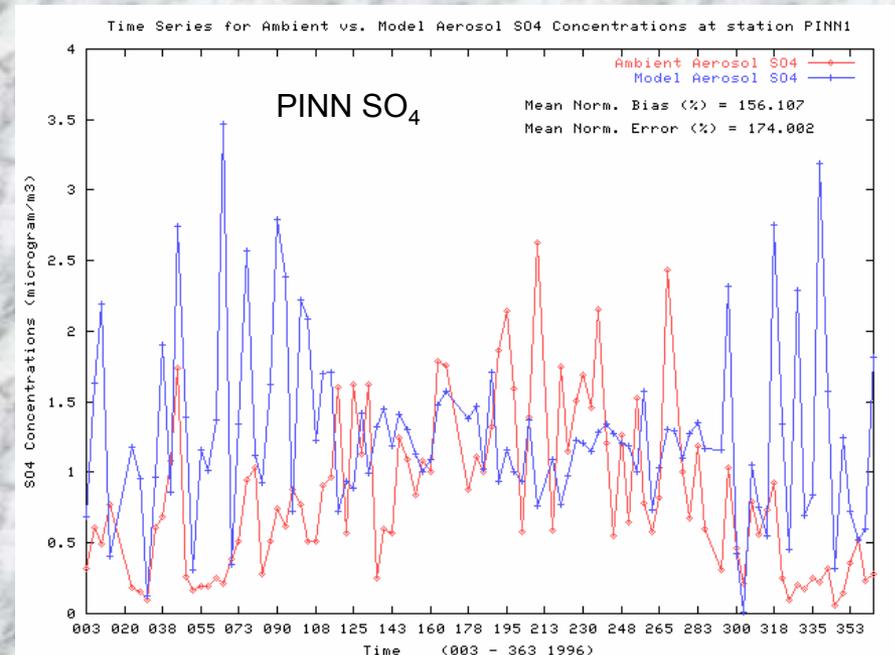
Failure Modes: Estimation Error and Process Error

CMAQ 36km



Expected uncertainty
in regional models.

Systematic
divergence between
model and reality.



CONCLUSIONS

- Tahoe Basin Source Activity and Emissions Uncertainty are Large
- Spatial Resolution Must Integrate from Fine-scale (Slope Flows) to Intercontinental Transport
- Wind Fields Must Address Large-scale Terrain Structures (Mountains, Lake) and Micro-scale Features (Forest, Urban)
- Current Regional Model Performance Casts Doubt on Applicability of Existing Models