



NASA Next Generation Geodetic Networks Simulations

Erricos C. Pavlis

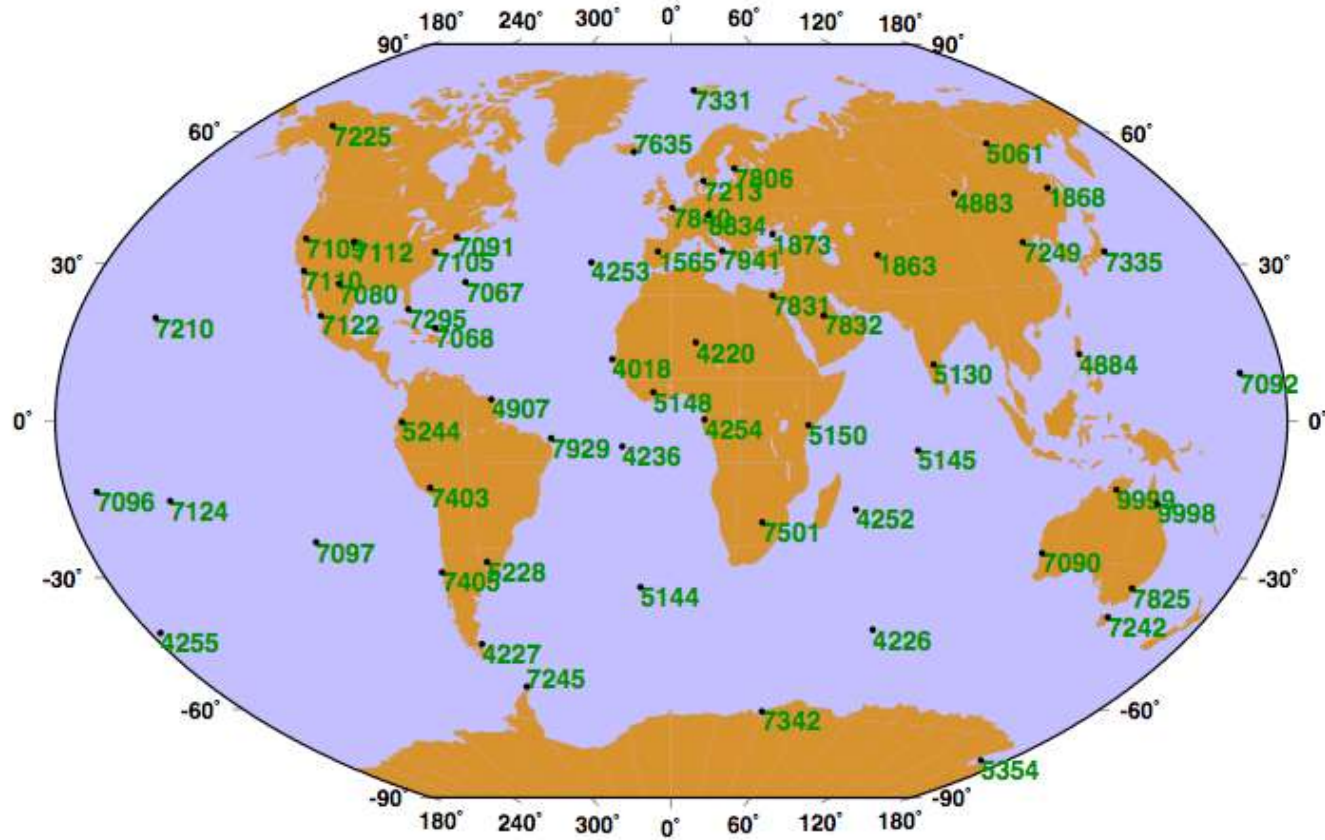
GGOS Ground Networks & Communications WG,
GGOS Retreat 2007
Oxnard, CA, Feb. 19-21, 2007

NNGGN Simulations

- SLR and VLBI optimal combination (first step)
- Inclusion of GNSS and other techniques (later, second step)
- Covariance analysis of several variants of ~ 60 globally distributed sites
- Simulation of SLR and VLBI data for the past 13 years (to develop a calibrated error model)
- Simulation of a 6-7 year period with SLR and VLBI data

Maximal Overlapping Network

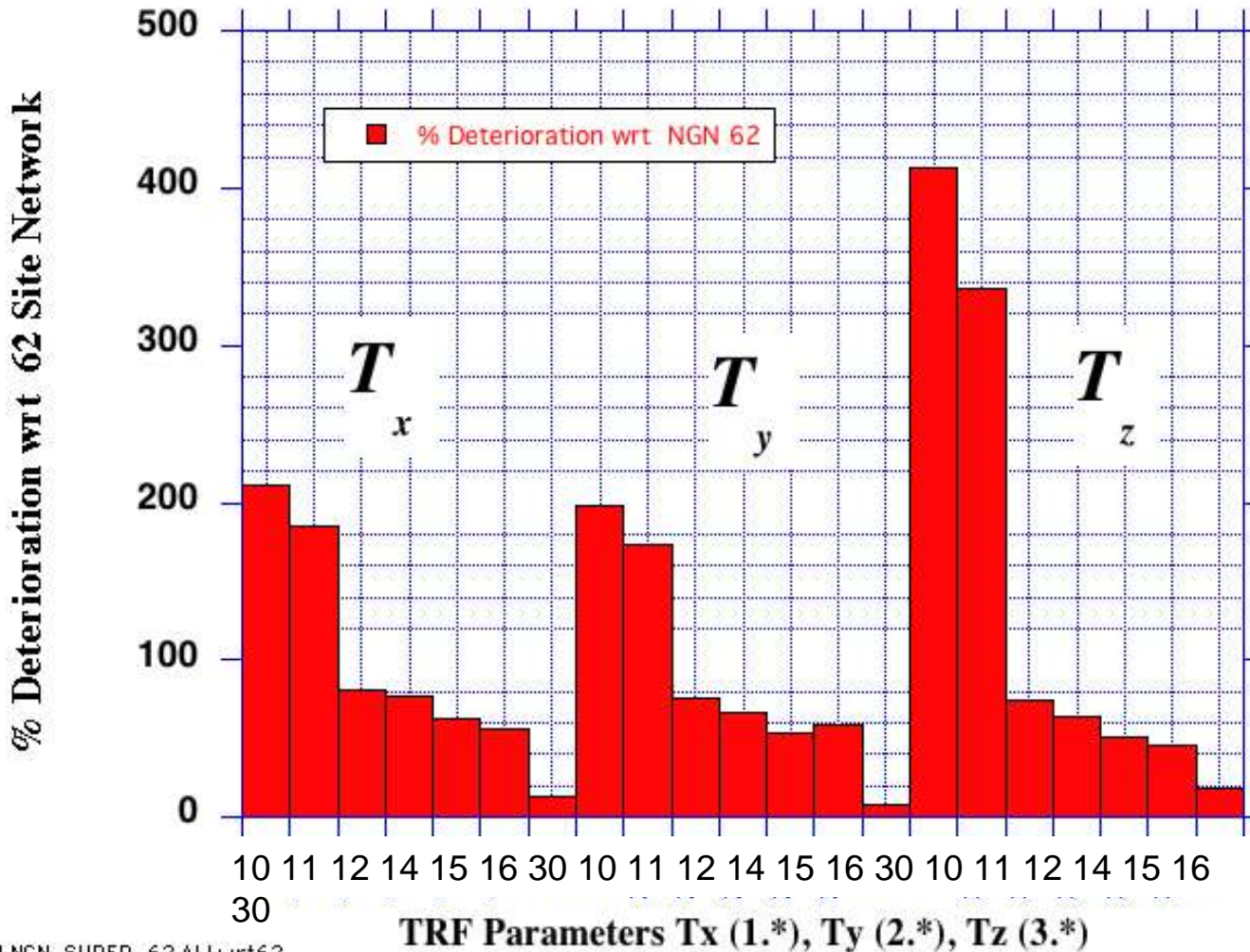
Next Generation NASA Networks 63 sites



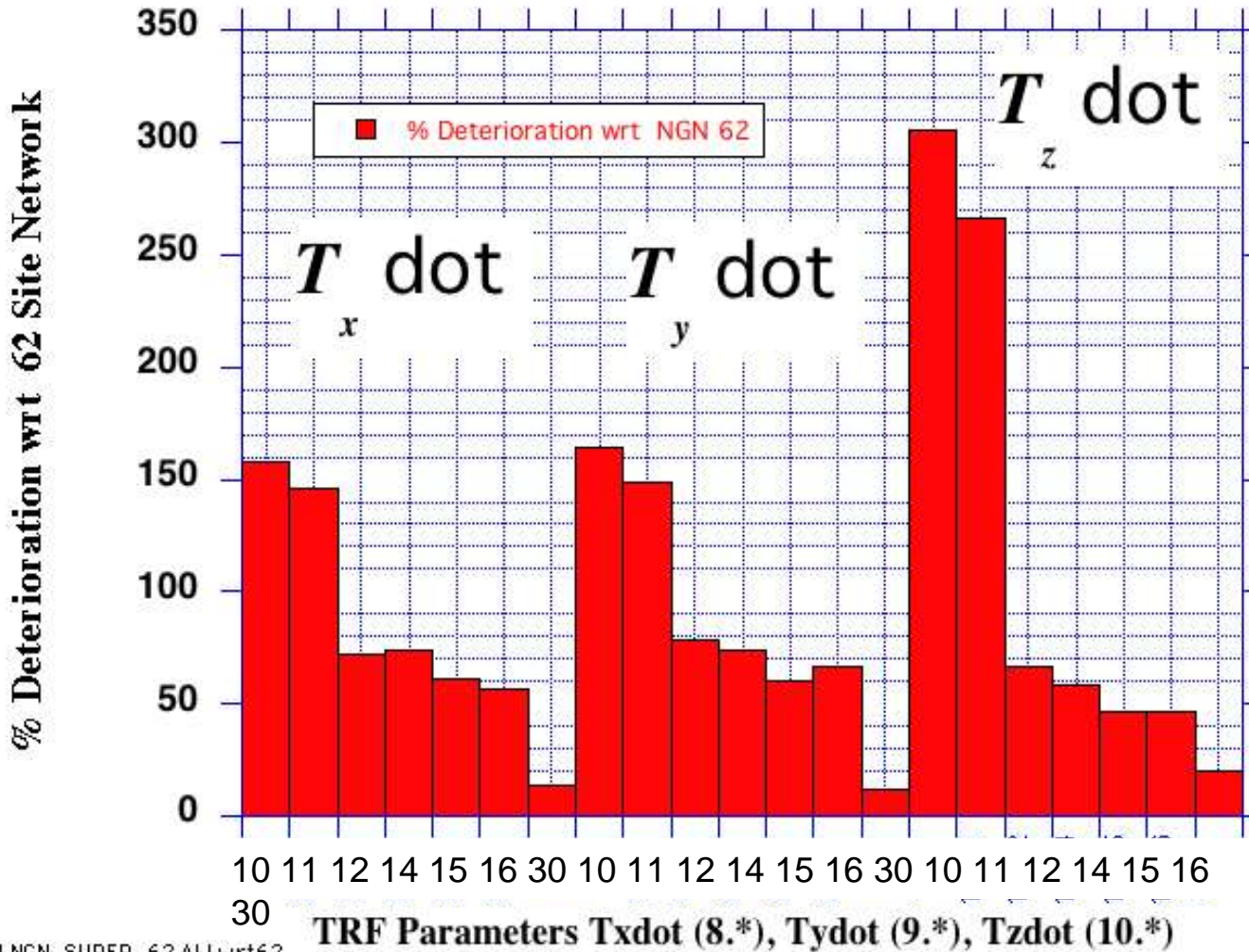
Covariance Predictions for Sub-networks

- The covariance of the 14-parameter similarity transformation is computed for progressively smaller networks, and the degradation in the accuracy of these estimates is noted as the network size decreases or site distribution degrades
 - Covariance studies with Monte Carlo runs
 - Simulation of SLR and VLBI data for 6-7 years in a second step

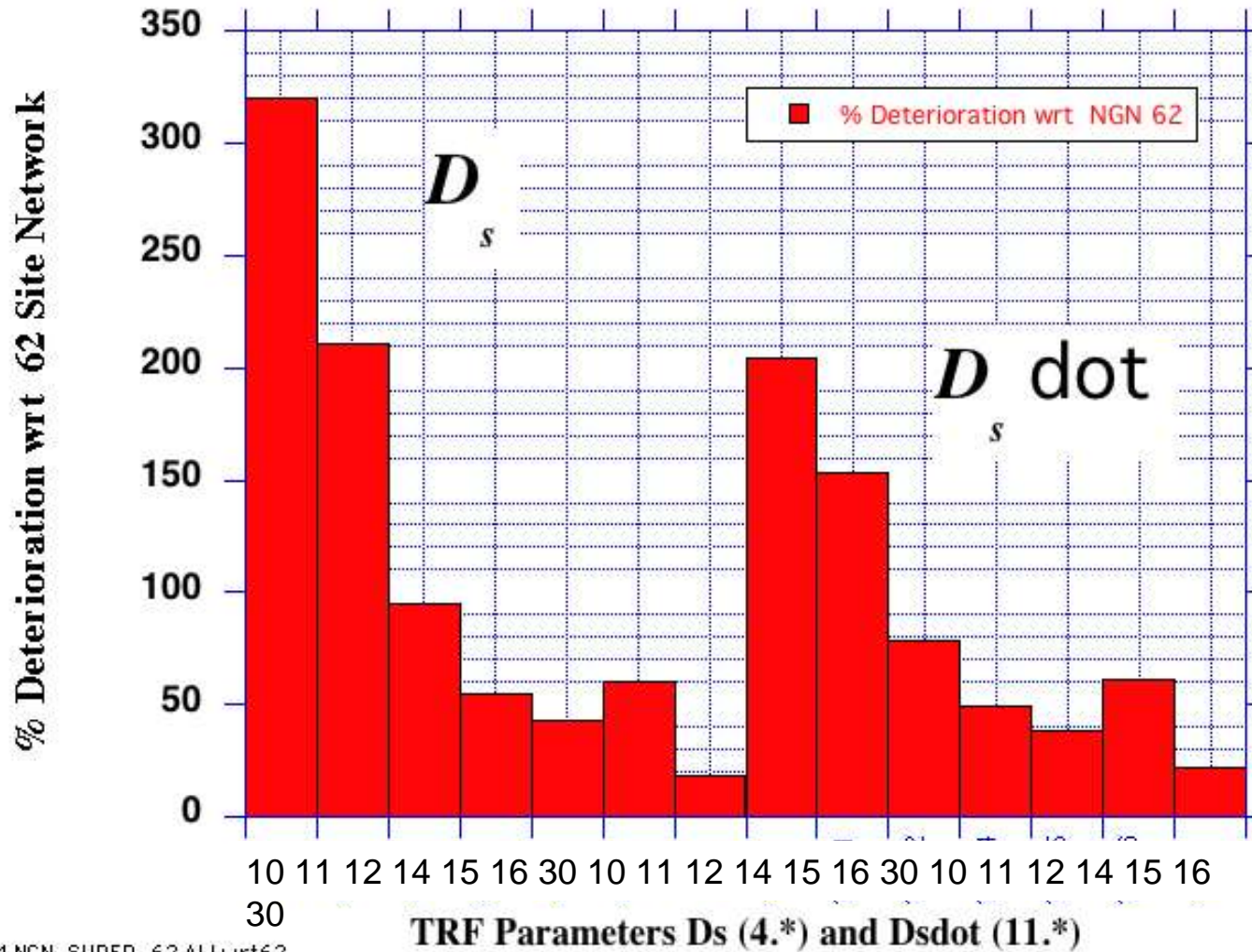
Covariance Results



Covariance Results



Covariance Results

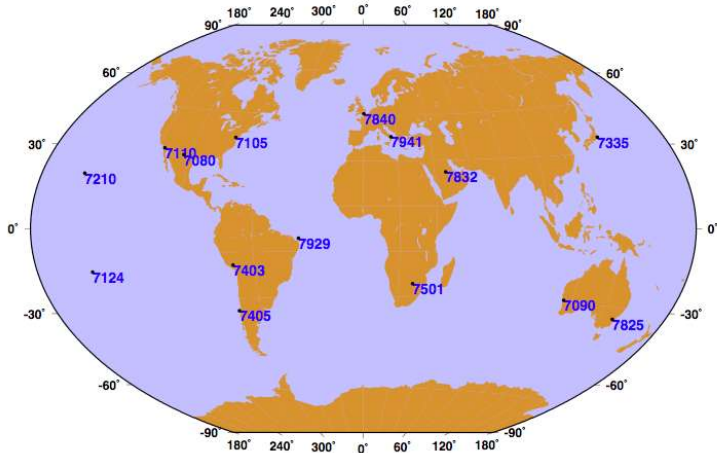


Summary

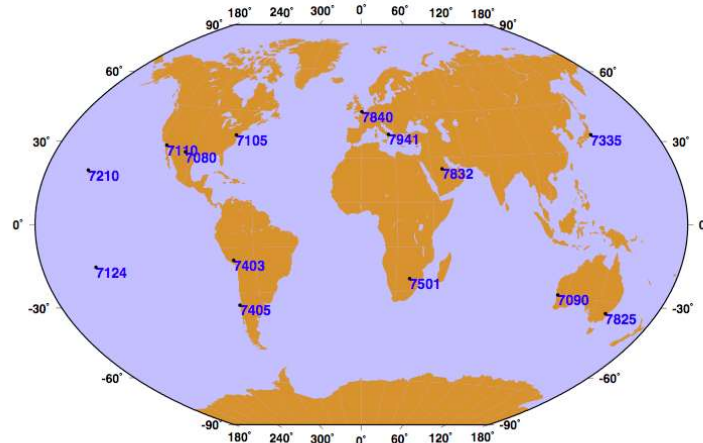
- The Z-component of the origin, the scale and their rates are the parameters most affected by the size of the defining network
- Irrespective of the examined parameter, ~12 stations is the minimum to meet the required 1 mm and 0.1mm/y GGOS goals
- The simulation process near the final step, the combined recovery of a TRF from simulated SLR and VLBI data will be presented at EGU'07

Network variants (15 \Rightarrow 10)

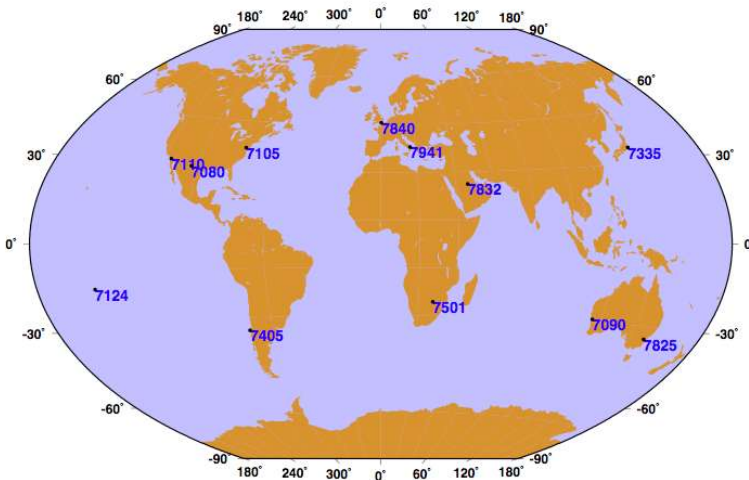
Next Generation NASA Networks 15 sites



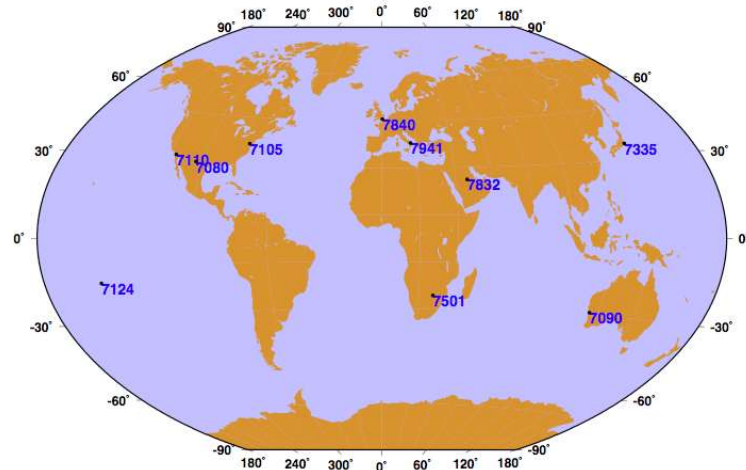
Next Generation NASA Networks 14 sites



Next Generation NASA Networks 12 sites

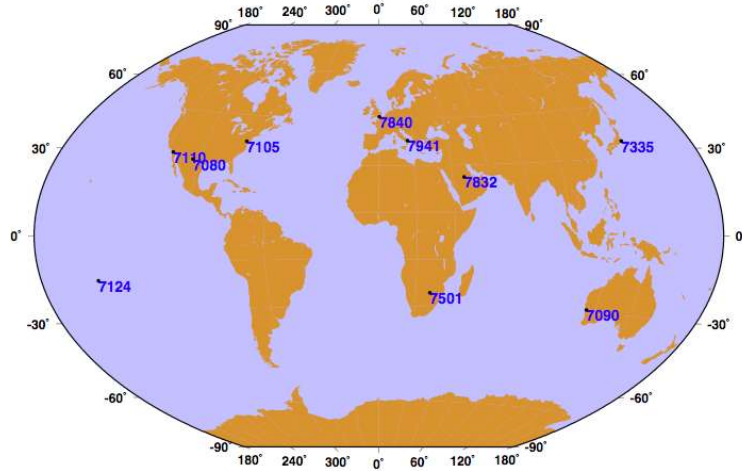


Next Generation NASA Networks 10 sites

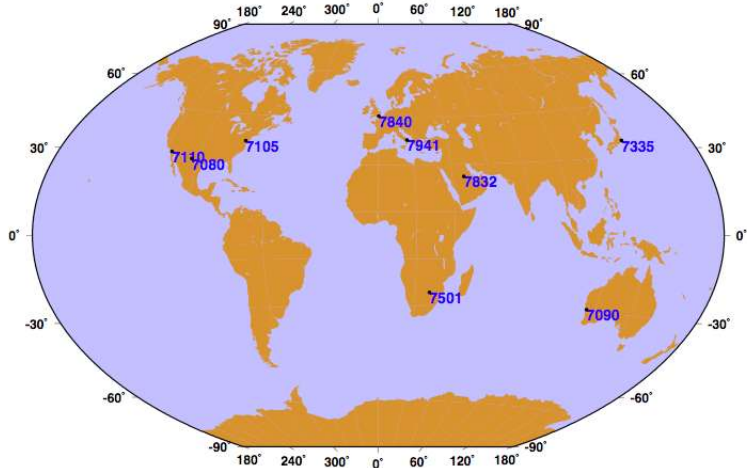


Network variants (10 \Rightarrow 8)

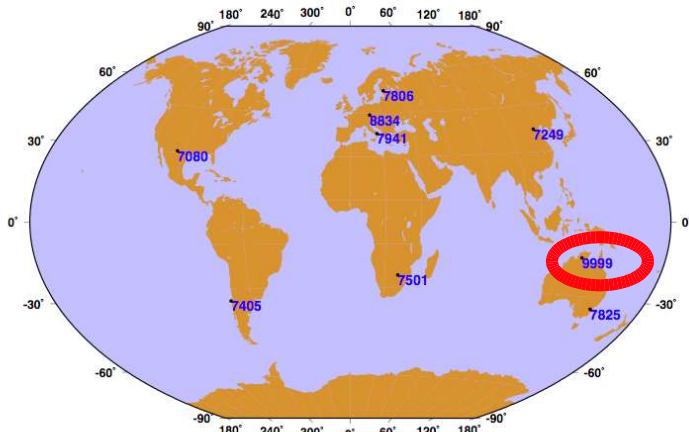
Next Generation NASA Networks 10 sites



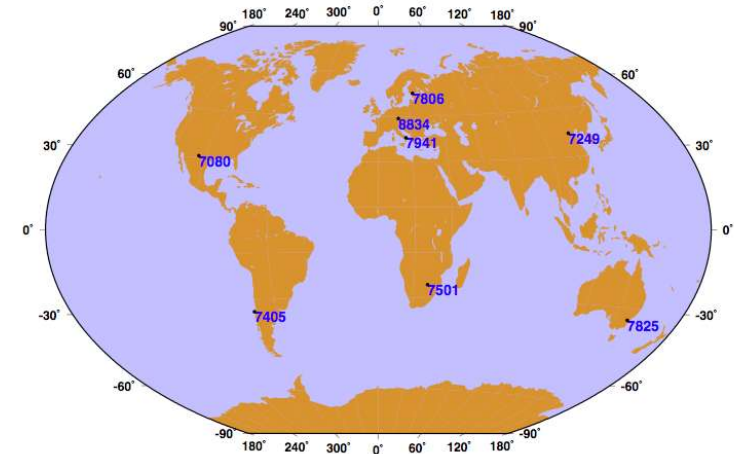
Next Generation NASA Networks 9 sites



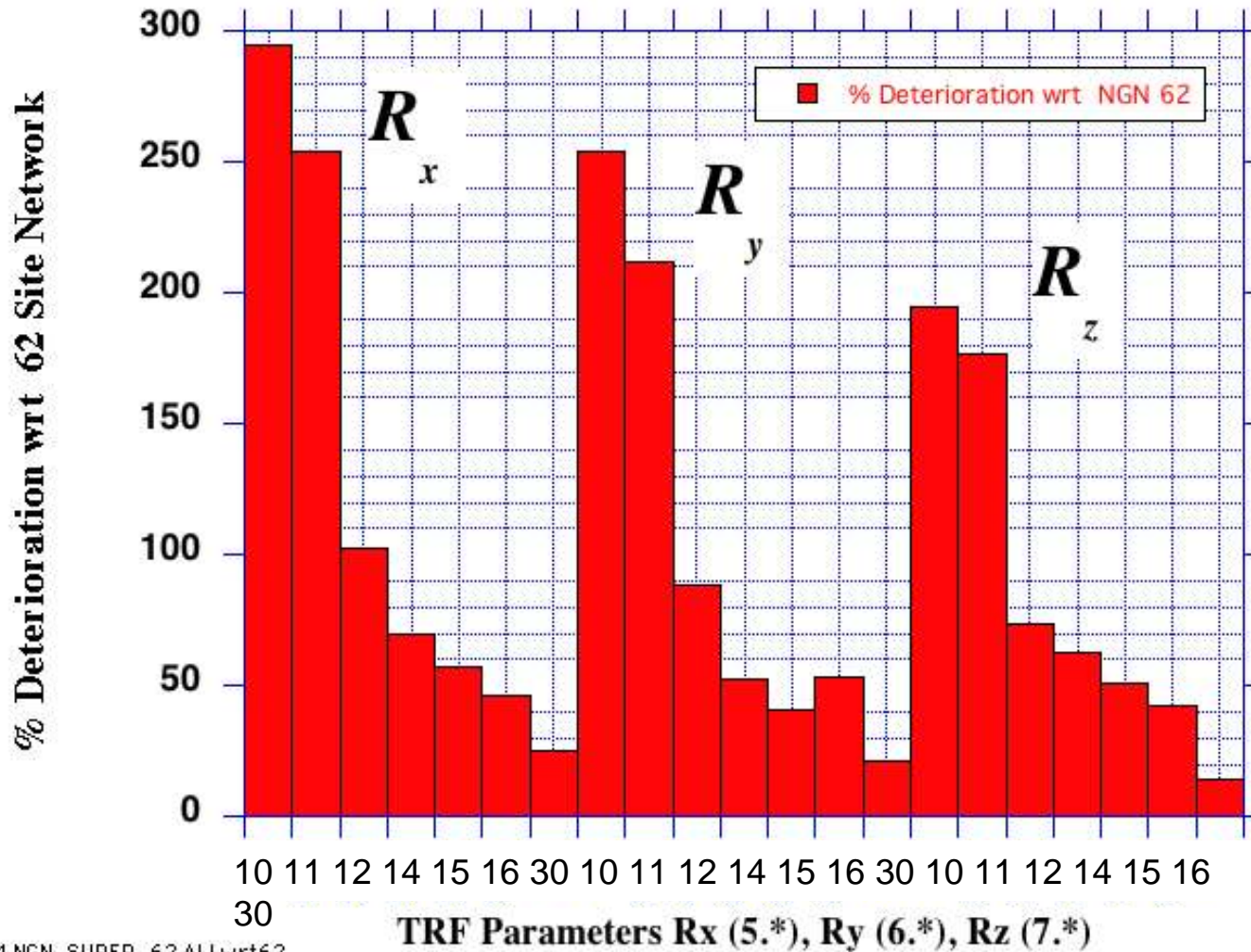
Next Generation NASA Networks R9 sites



Next Generation NASA Networks R8 sites



Covariance Results



Covariance Results

