

D683.5

# North Atlantic Spreading Rates Inferred from LAGEOS

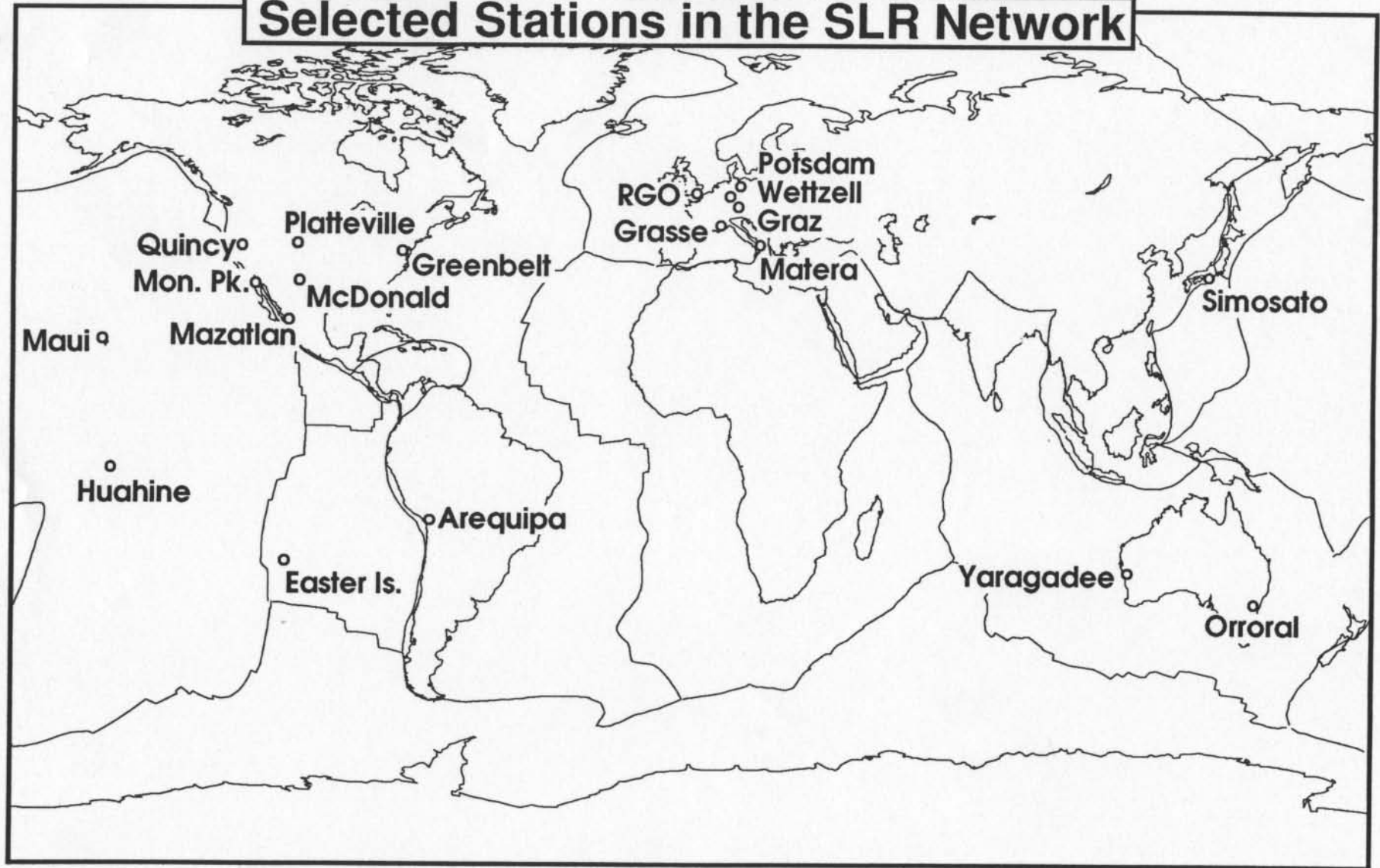
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## Selected Stations in the SLR Network



- Laser tracking data spans the period: 1979 - 1988
- Solution used in this work is SL7.1 - DAN2

# Network Adjustment Program

**GIVEN:**  
Time series of  
quarterly station positions

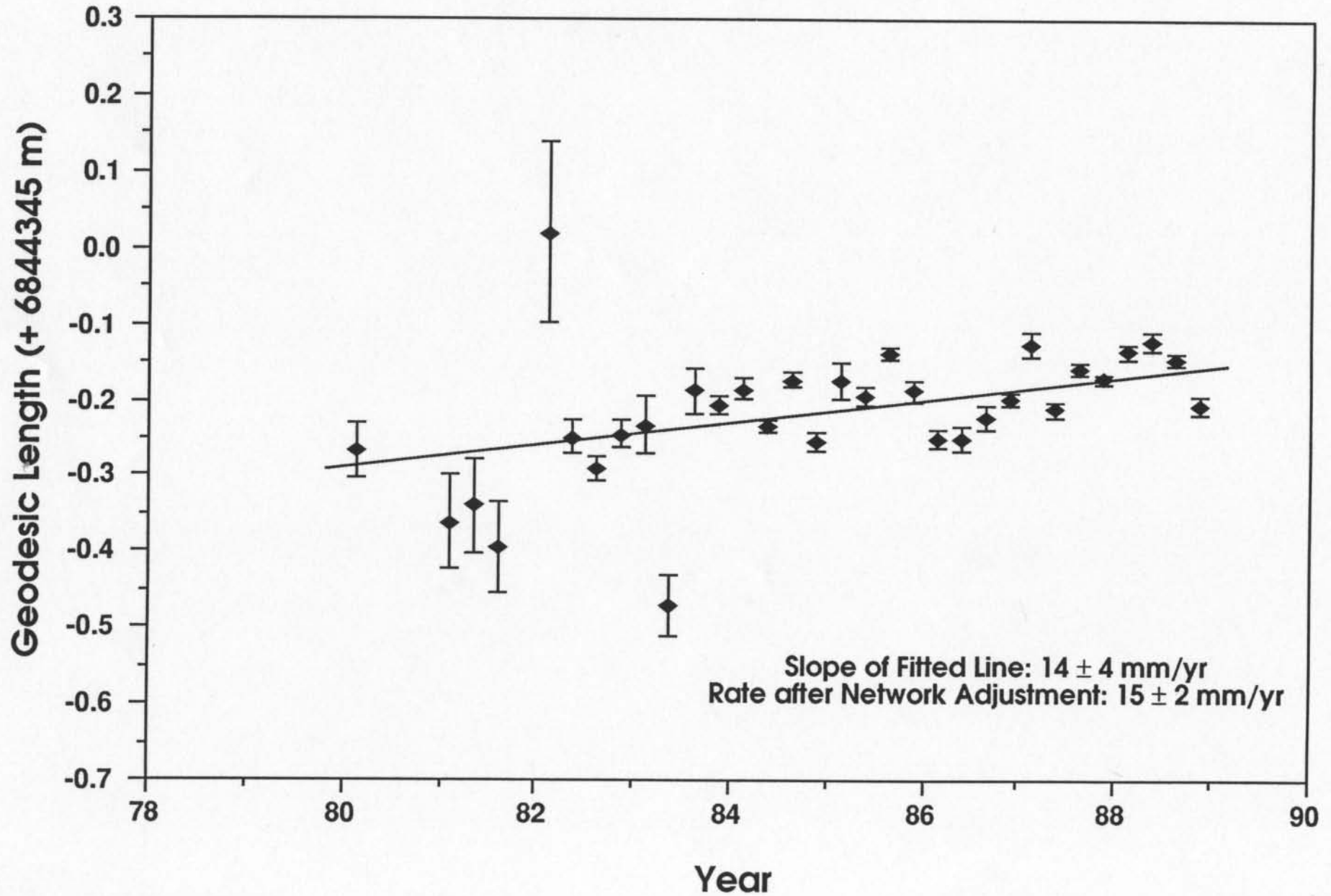
**COMPUTE:**  
Geodesic distances between all  
stations in each quarter

**COMPUTE:**  
Relative Geodesic Rates  
between network stations

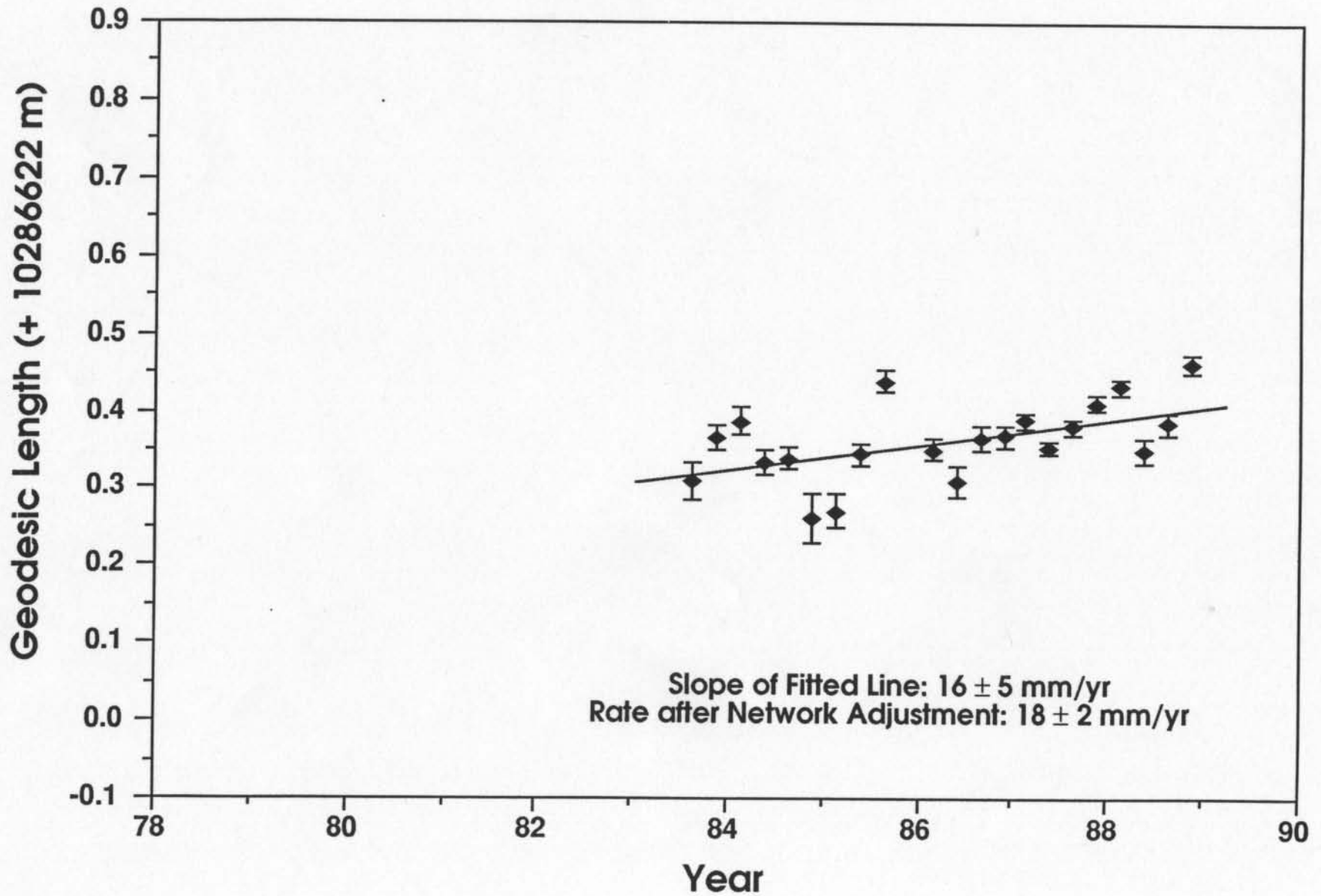
**Simultaneous Solution**  
L.S. estimation of station vector motions  
which best satisfy the relative rates.

**The SL7.1 Model of Tectonic Motions  
for Satellite Laser Ranging Stations**

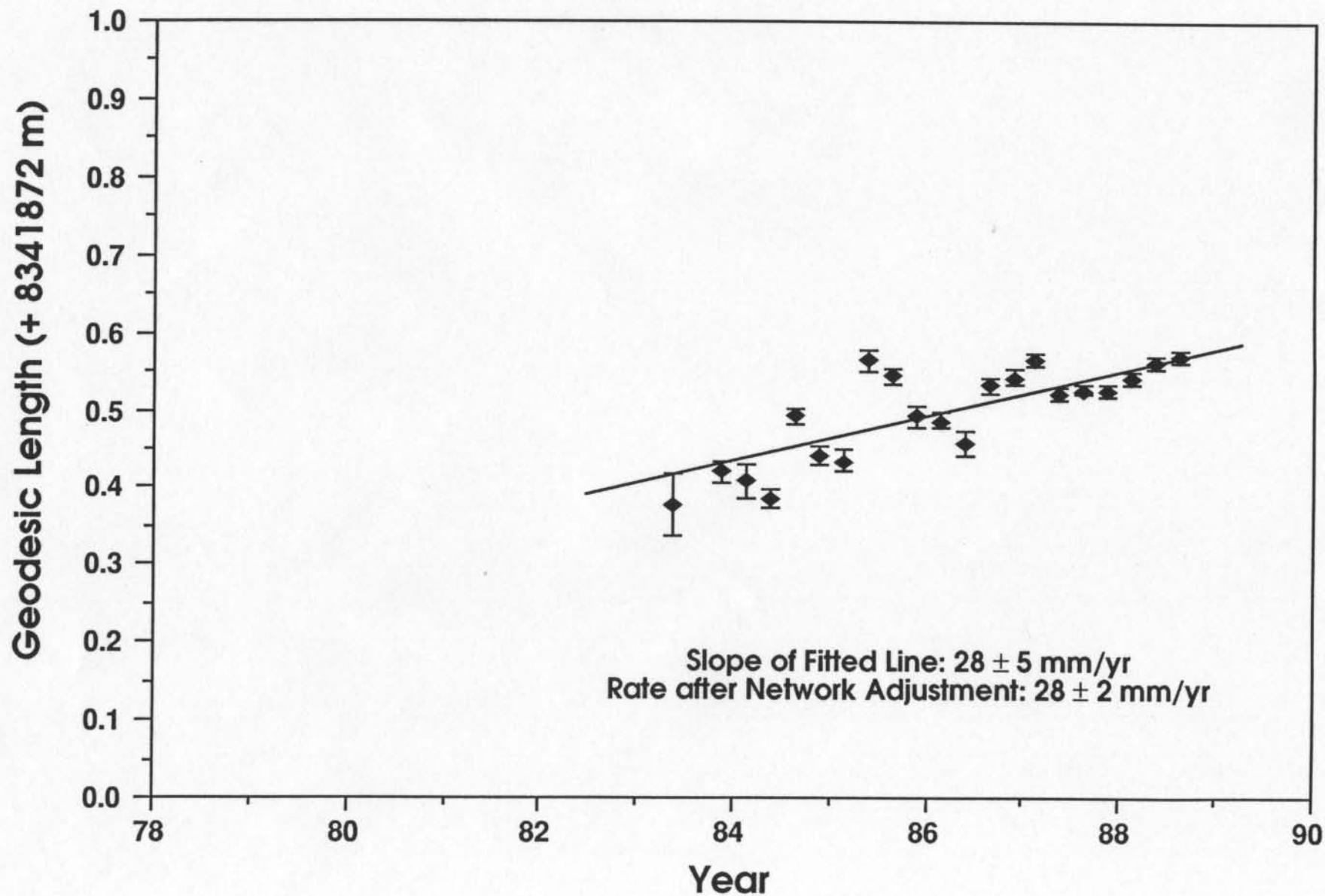
# Greenbelt - Wettzell



# Mazatlan - Graz

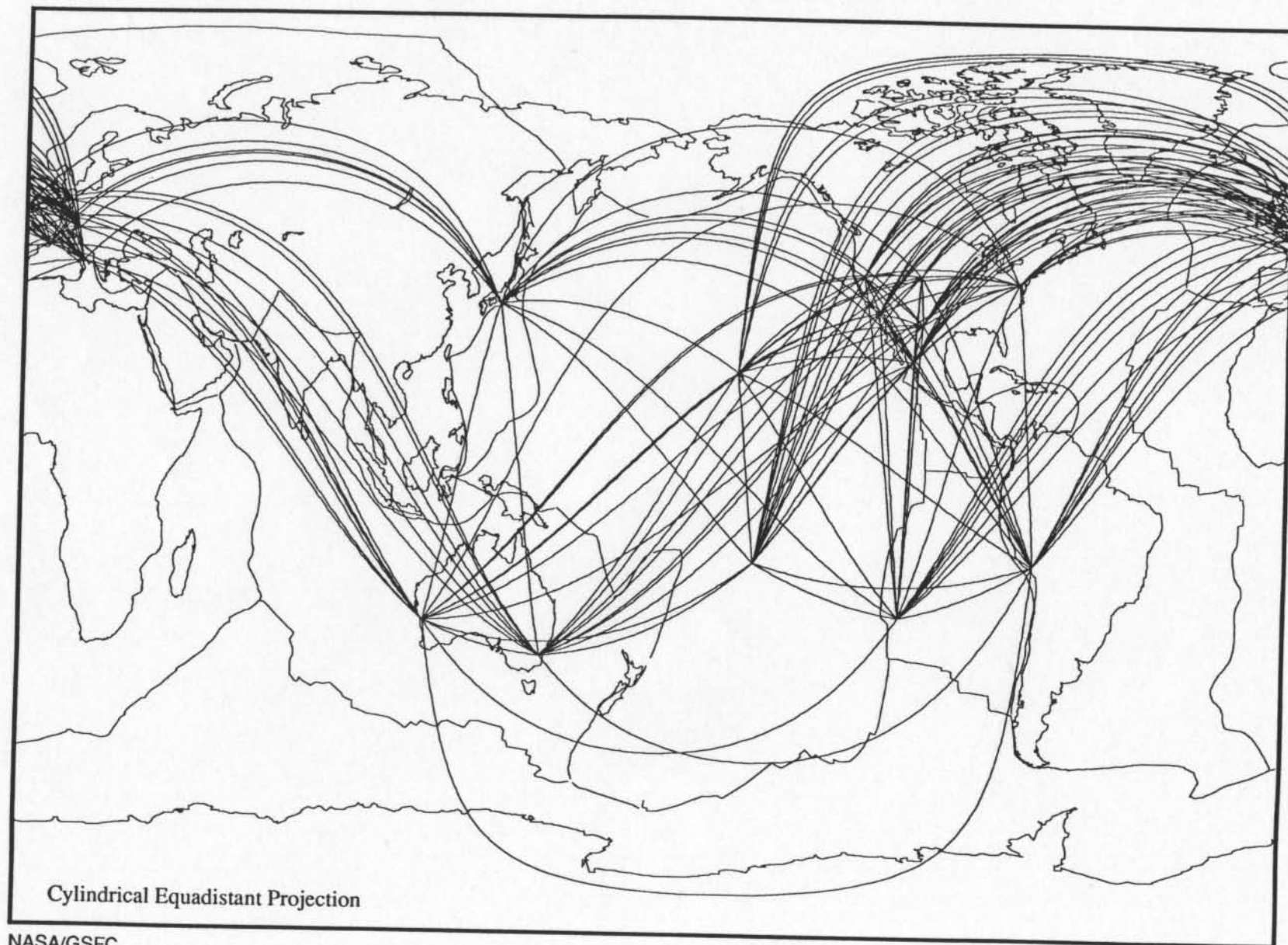


# McDonald Obs. - RGO

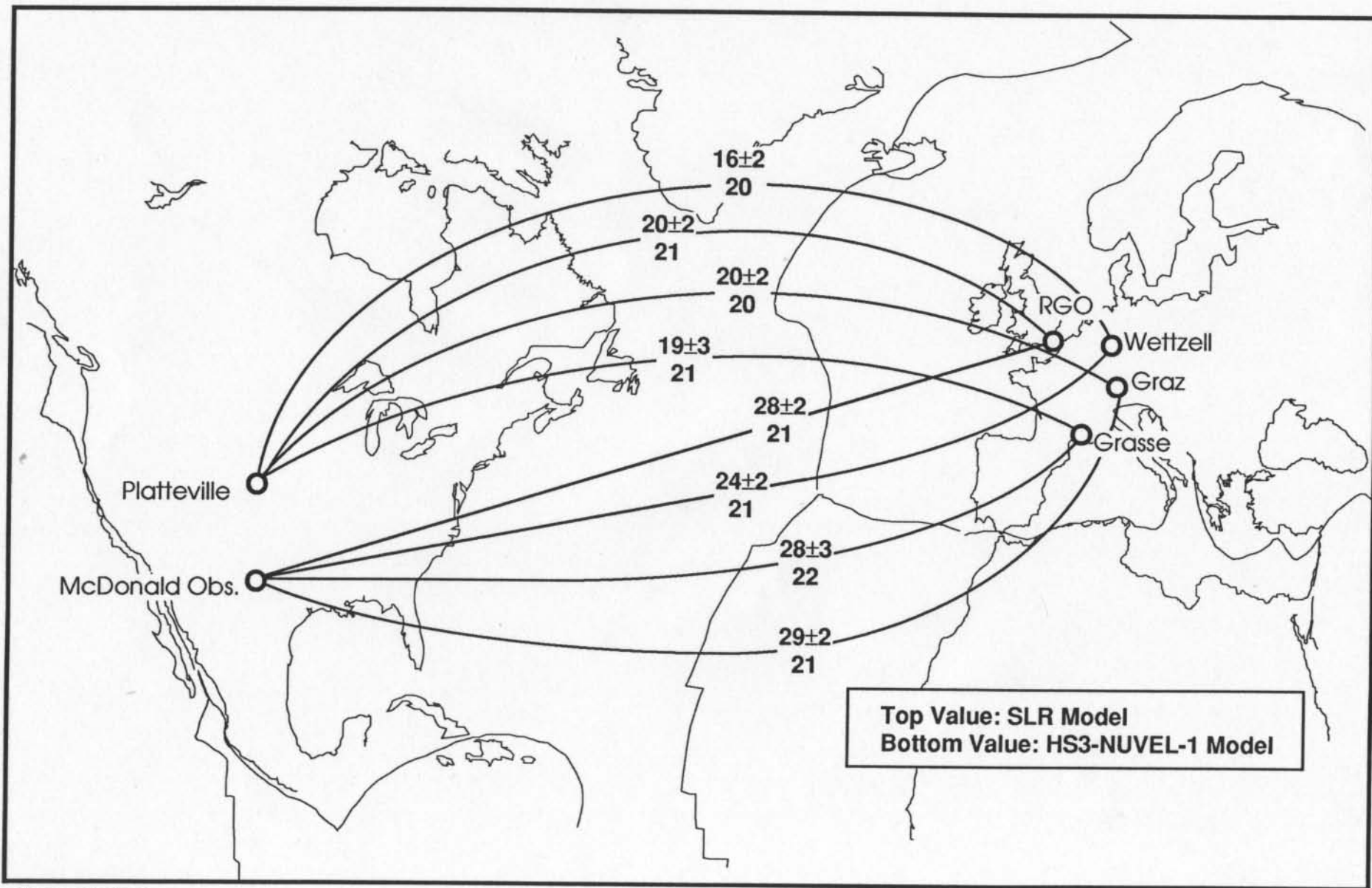




# Geodesic Traces between SLR Sites



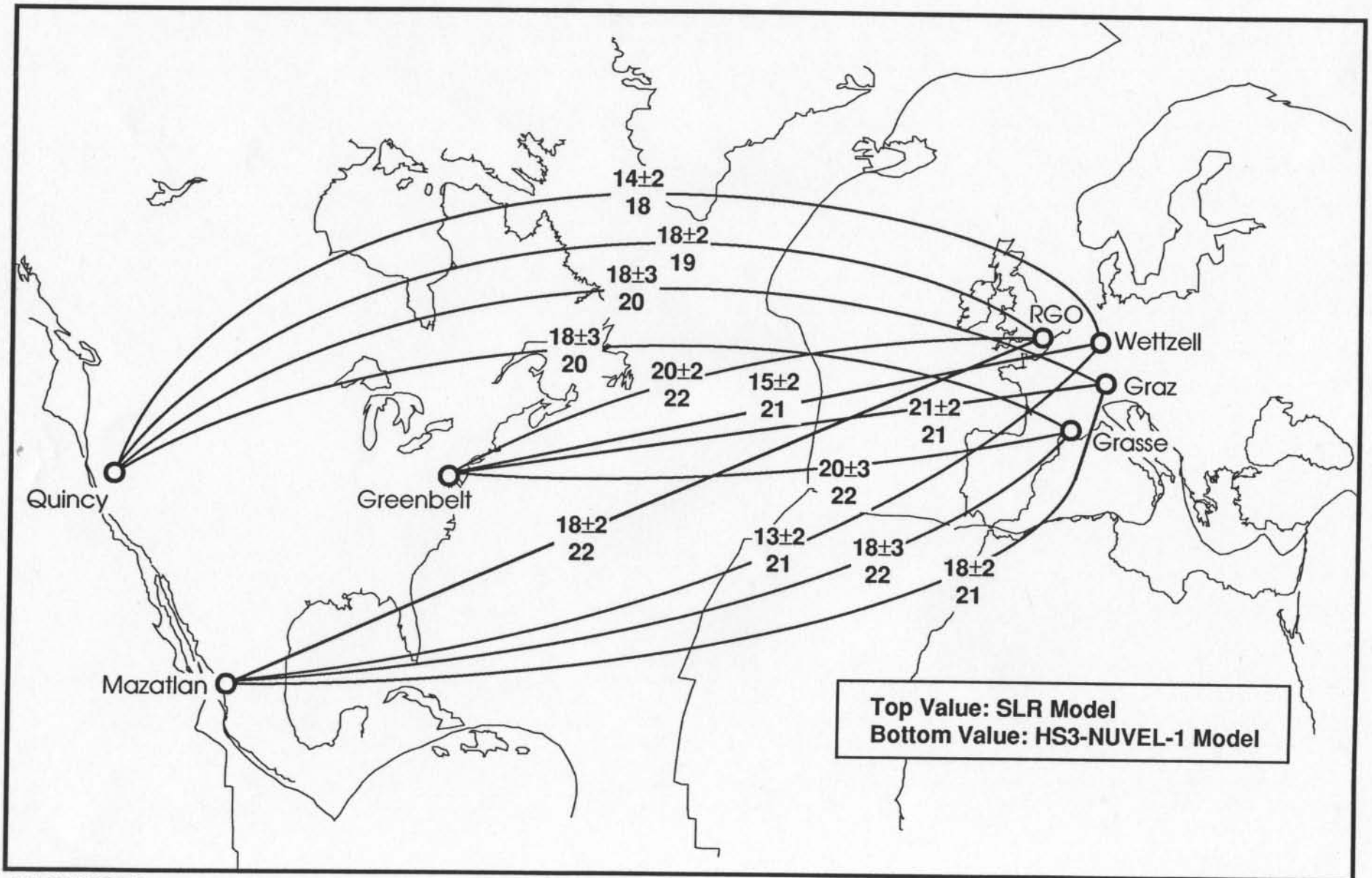
# TRANS-ATLANTIC GEODESIC RATES FROM SLR TRACKING TO LAGEOS



Top Value: SLR Model  
 Bottom Value: HS3-NUVEL-1 Model



# TRANS-ATLANTIC GEODESIC RATES FROM SLR TRACKING TO LAGEOS



Top Value: SLR Model  
Bottom Value: HS3-NUVEL-1 Model

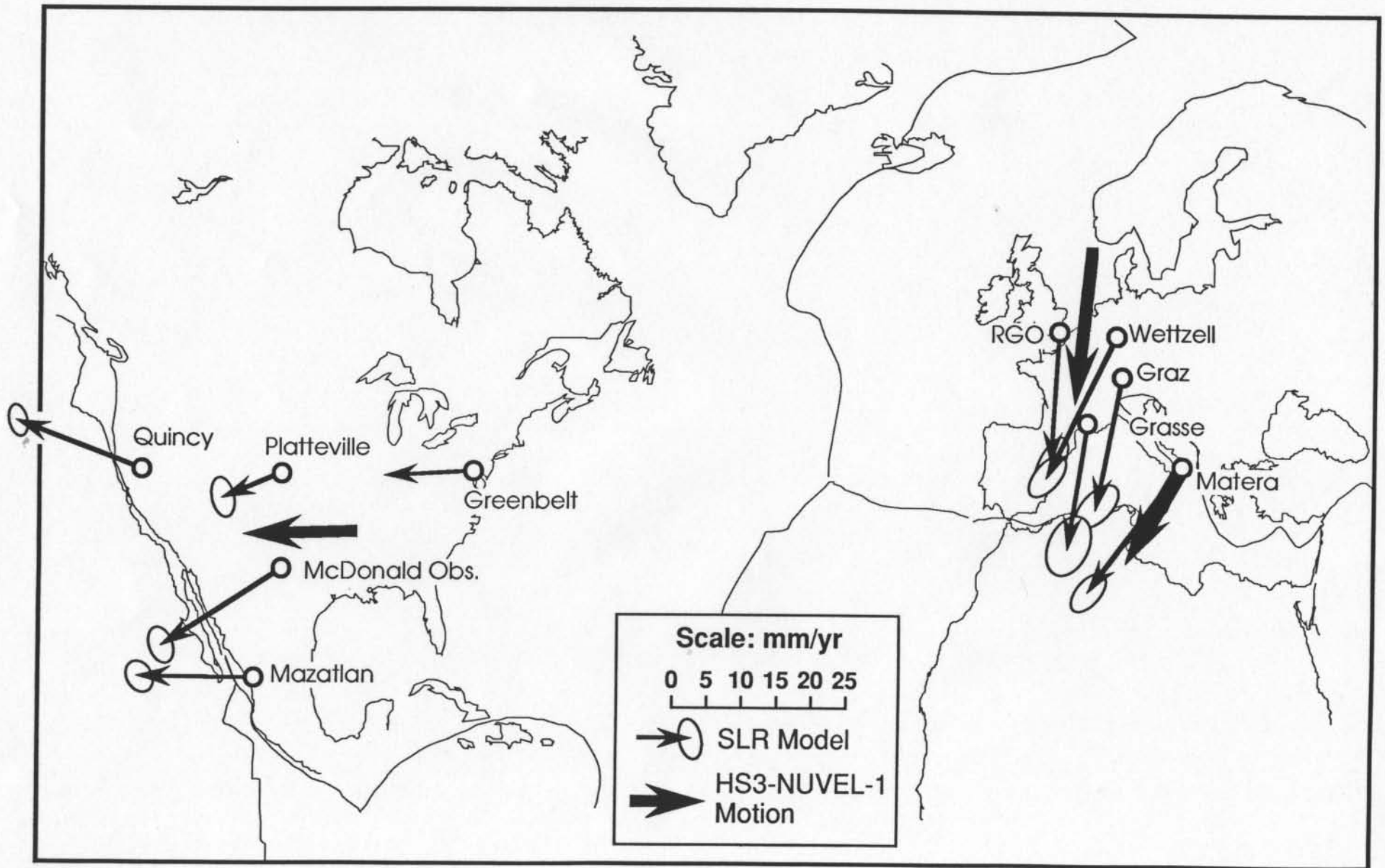
# Geodesic Rates Across the North Atlantic

	<b>Wetzell</b> 7834	<b>RGO</b> 7840	<b>Grasse</b> 7835	<b>Graz</b> 7839	<b>Matera*</b> 7939
<b>Greenbelt</b> 7105	15 ± 2 21	20 ± 2 22	20 ± 3 22	21 ± 2 21	13 ± 2 15
<b>McDonald</b> 7080	24 ± 2 21	28 ± 2 21	28 ± 3 22	29 ± 2 21	22 ± 2 14
<b>Platteville</b> 7112	16 ± 2 20	20 ± 2 21	19 ± 3 21	20 ± 2 20	13 ± 2 13
<b>Mazatlan</b> 7122	13 ± 2 21	18 ± 2 22	18 ± 3 22	18 ± 2 21	11 ± 2 15
<b>Quincy</b> 7109	14 ± 2 18	18 ± 2 19	18 ± 3 20	17 ± 2 18	12 ± 2 11

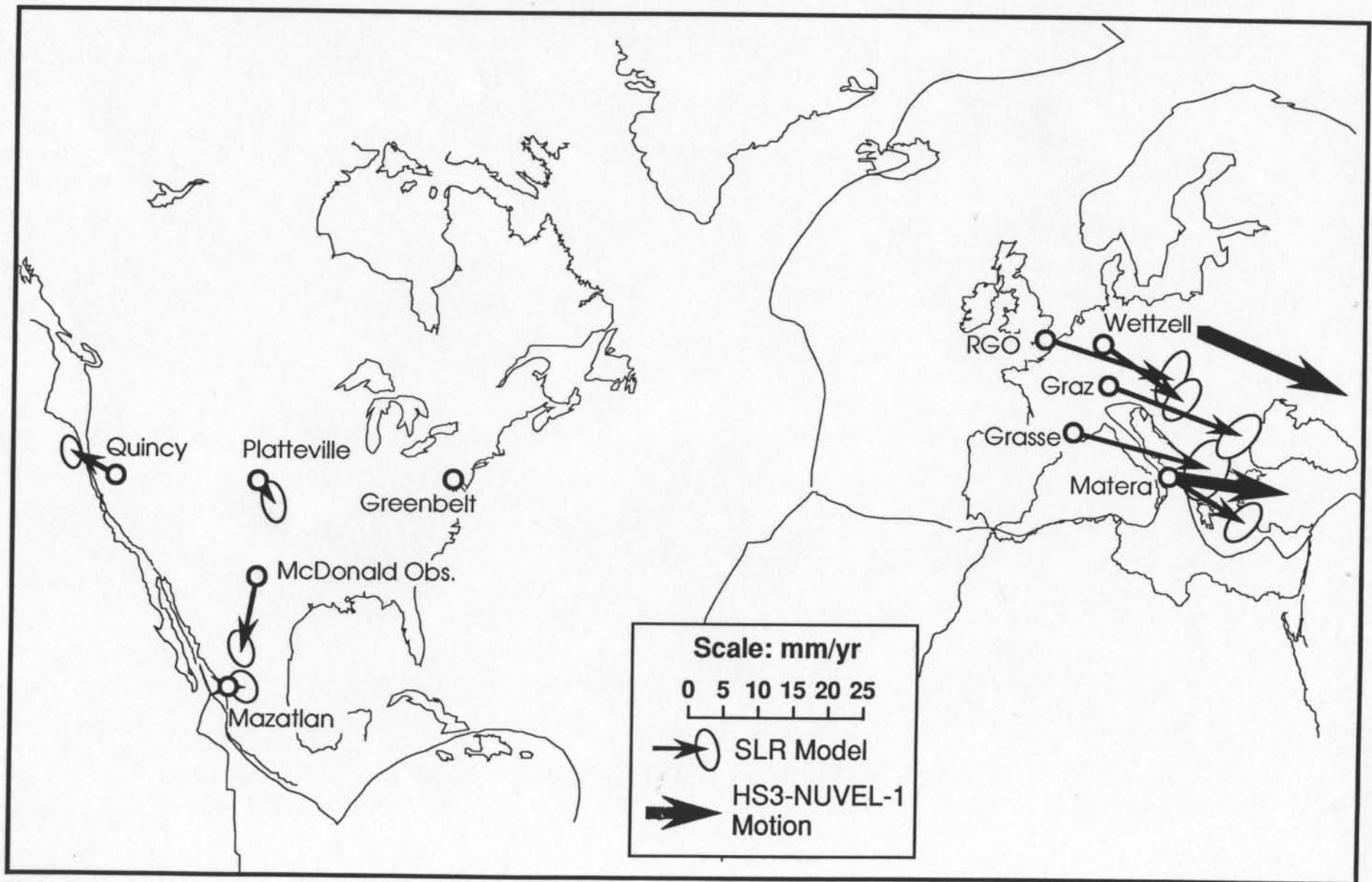
\* African Plate assumed

Top values: SLR Model - Bottom Values: HS3 - NUVEL-1

# Motions of Sites from SLR Model



# Residual Motion wrt North America



# Summary

- The SLR velocity model yields rates between North America and Europe which have uncertainties of 2 mm/yr on most baselines.
- The addition of 1988 data to the solution has increased the SLR geodesic rates on some baselines by 1 - 2 mm/yr over previous solutions.
- The SLR site velocity model is now referenced to HS3-NUVEL1.
- The agreement with HS3-NUVEL1 is at the 10% level for North Atlantic baselines, excluding Wettzell and McDonald, with SLR showing slightly slower spreading.
- Wettzell and McDonald results continue to suggest greater deviation, but may be related to data problems.