

SINEX Combination Procedure at IGS CC

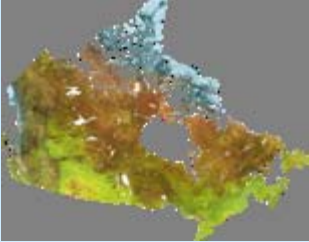
Rémi Ferland
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Canada

Ressources naturelles
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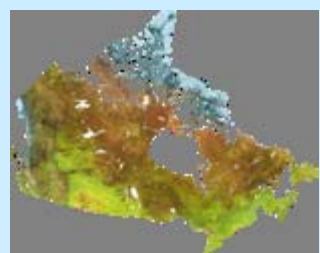
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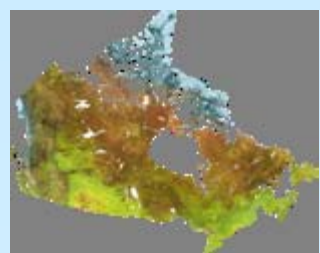




IGS Combination Objectives

- Generate the solution for:
 - Station coordinates & velocities,
 - ERP's,
 - Apparent Geocenter.
- With:
 - Appropriate covariance information,
 - Alignment to ITRF.
- Report and Investigate abnormal Behavior





Input Information

- Analysis centers (AC) solutions

cod **emr** **esa** **gfz**
jpl **mit** **ngs** **sio** = **ACs**

- Global network associate analysis center (GNAAC) solutions

mit **ncl** = **GNAACs**

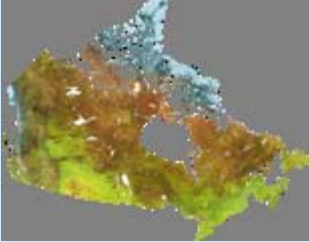
- Apriori solutions

ITRF **IGS**_{i-1} **igs**_{i-1} = **Apriori**
IGS Realization Cumulative Weekly

- Other sources

Time Series **Station Logs**
Discontinuities **IGS Mail**





AC Processing

AC	Software	Comment
cod	Bernese	D.D. / L.S.
emr	Gipsy	U.D. / Kalman filter
esa	BAHN ...	U.D. / L.S.
gfz	EPOS.P	U.D. / L.S.
jpl	Gipsy	U.D. / Kalman filter
mit	GAMIT ...	D.D. / L.S.
ngs	Pages ...	D.D. / L.S.
sio	GAMIT ...	D.D. / L.S.

- Independent Software
- Reuse of data
- Evolution

U.D. = Undifferenced

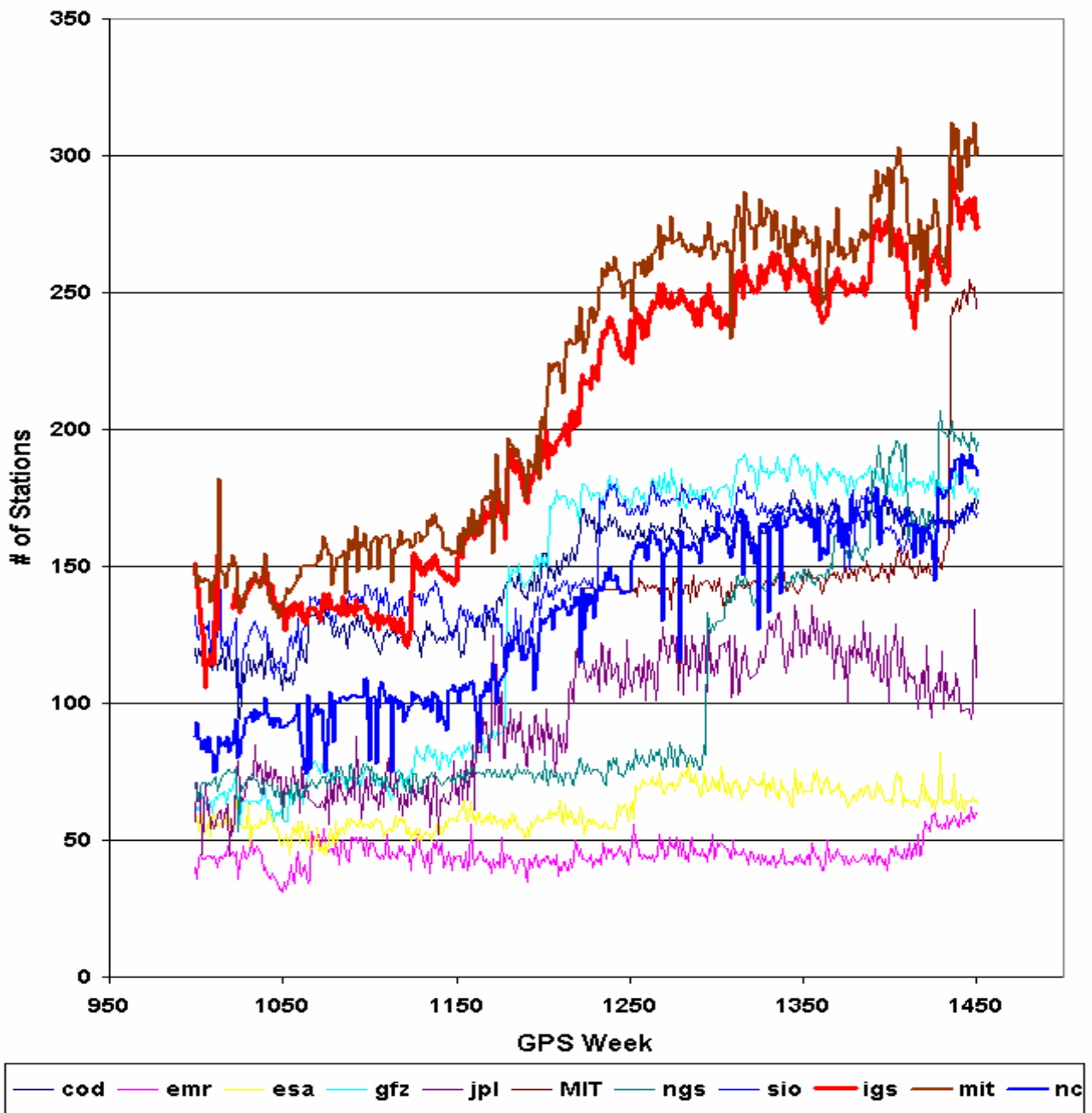
D.D. = Double Differences

L.S. = Least Squares



Stations Processing Evolution

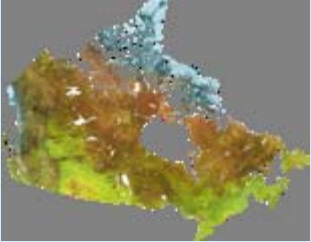
Number of stations in ACs Weekly Combination



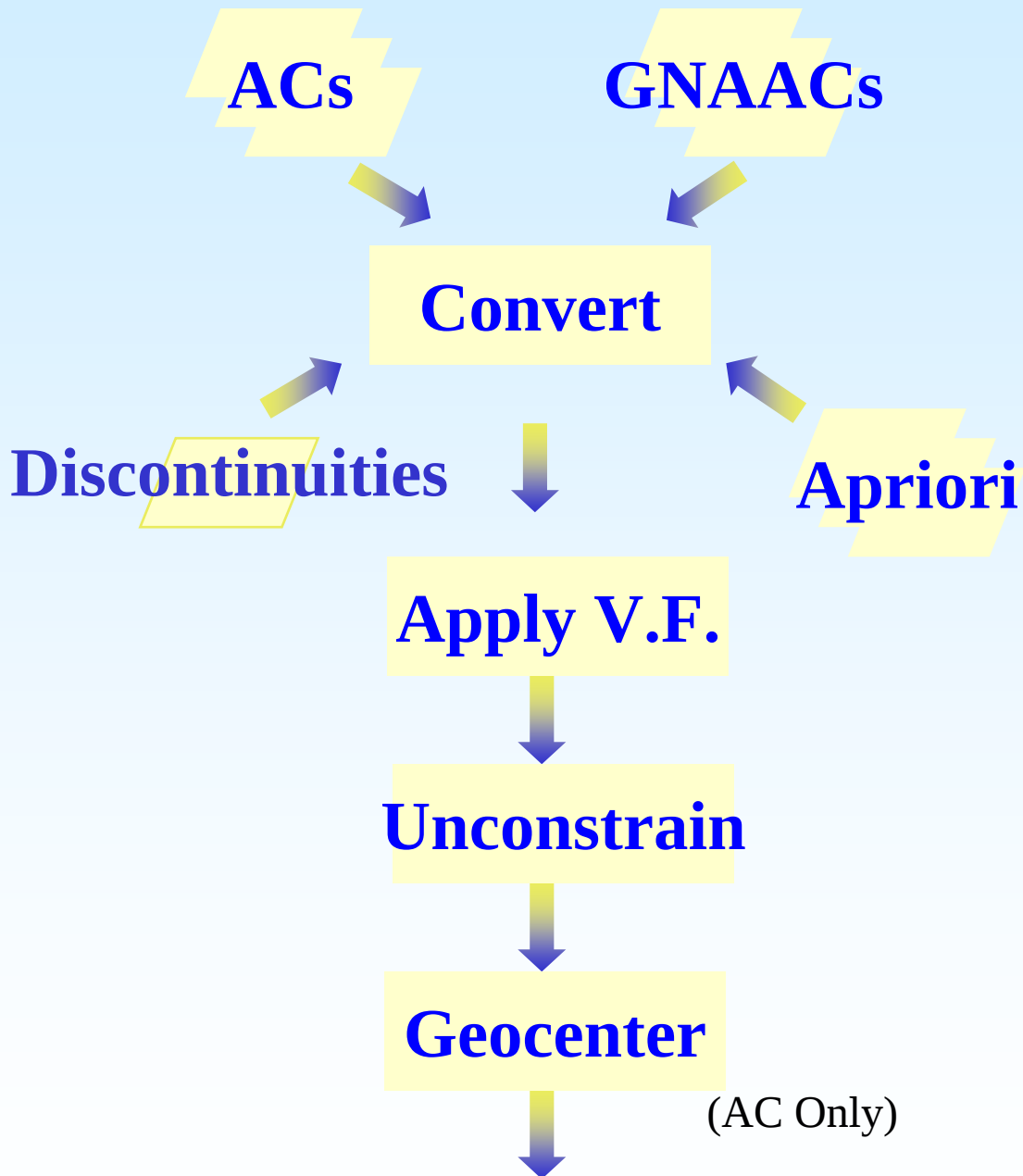
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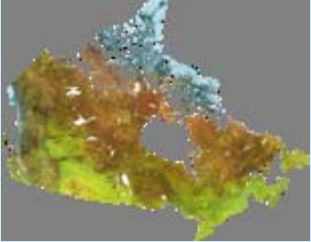
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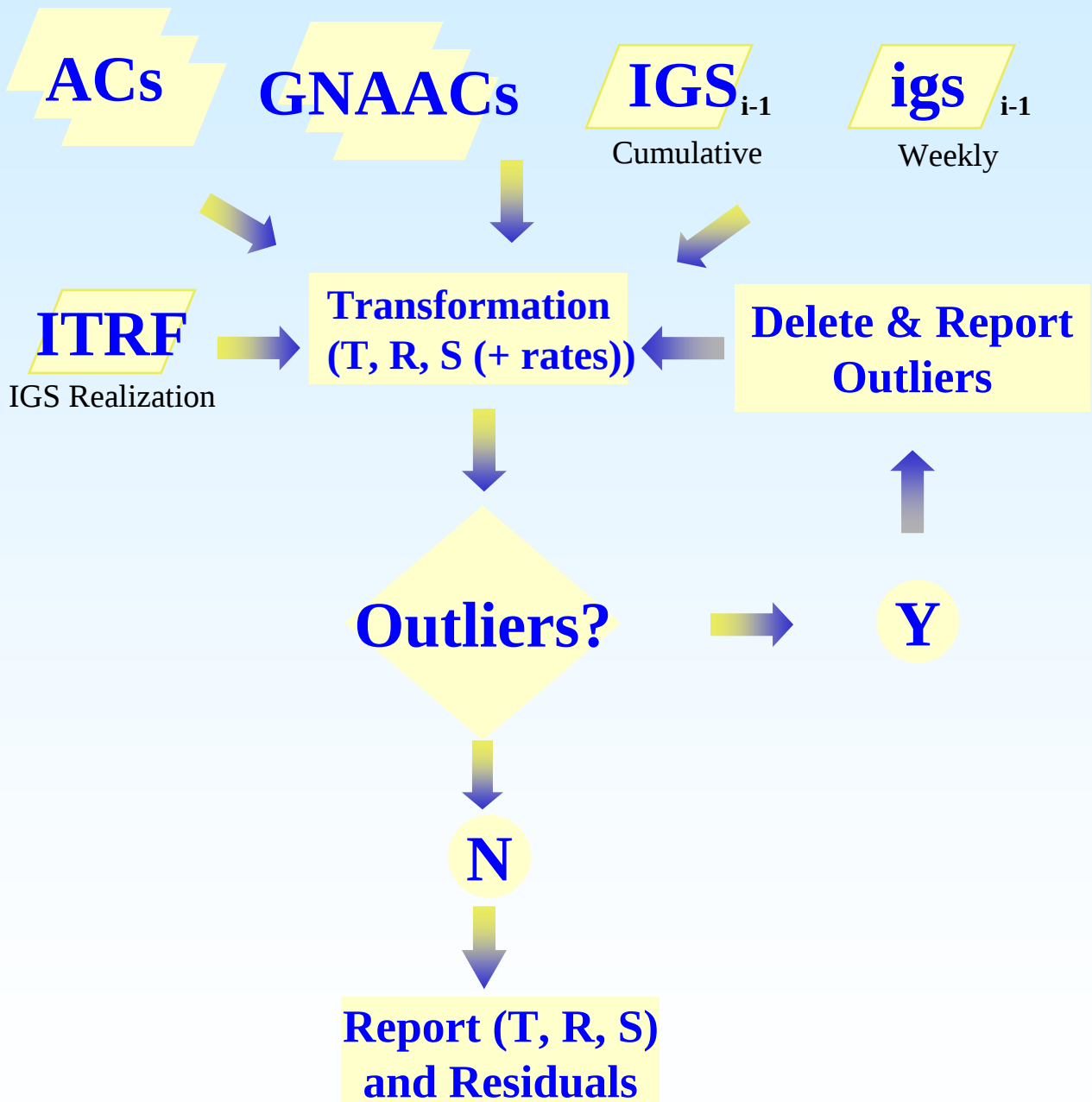


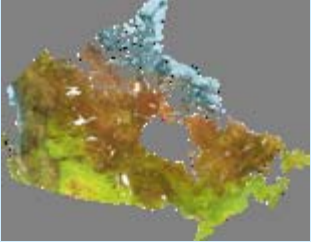
Preprocessing



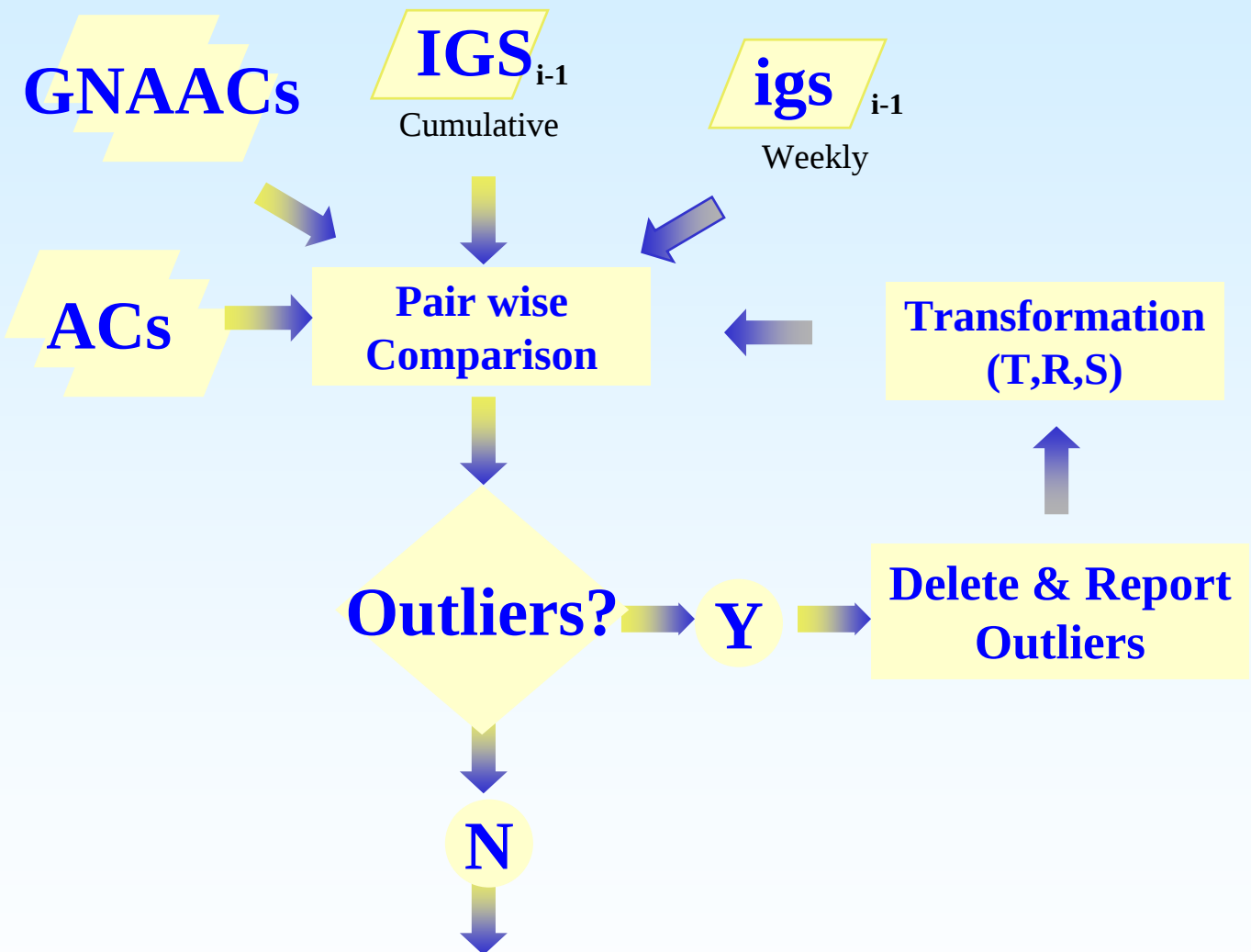


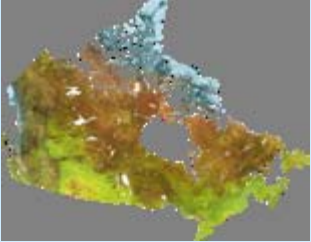
Alignment to the Reference Frame



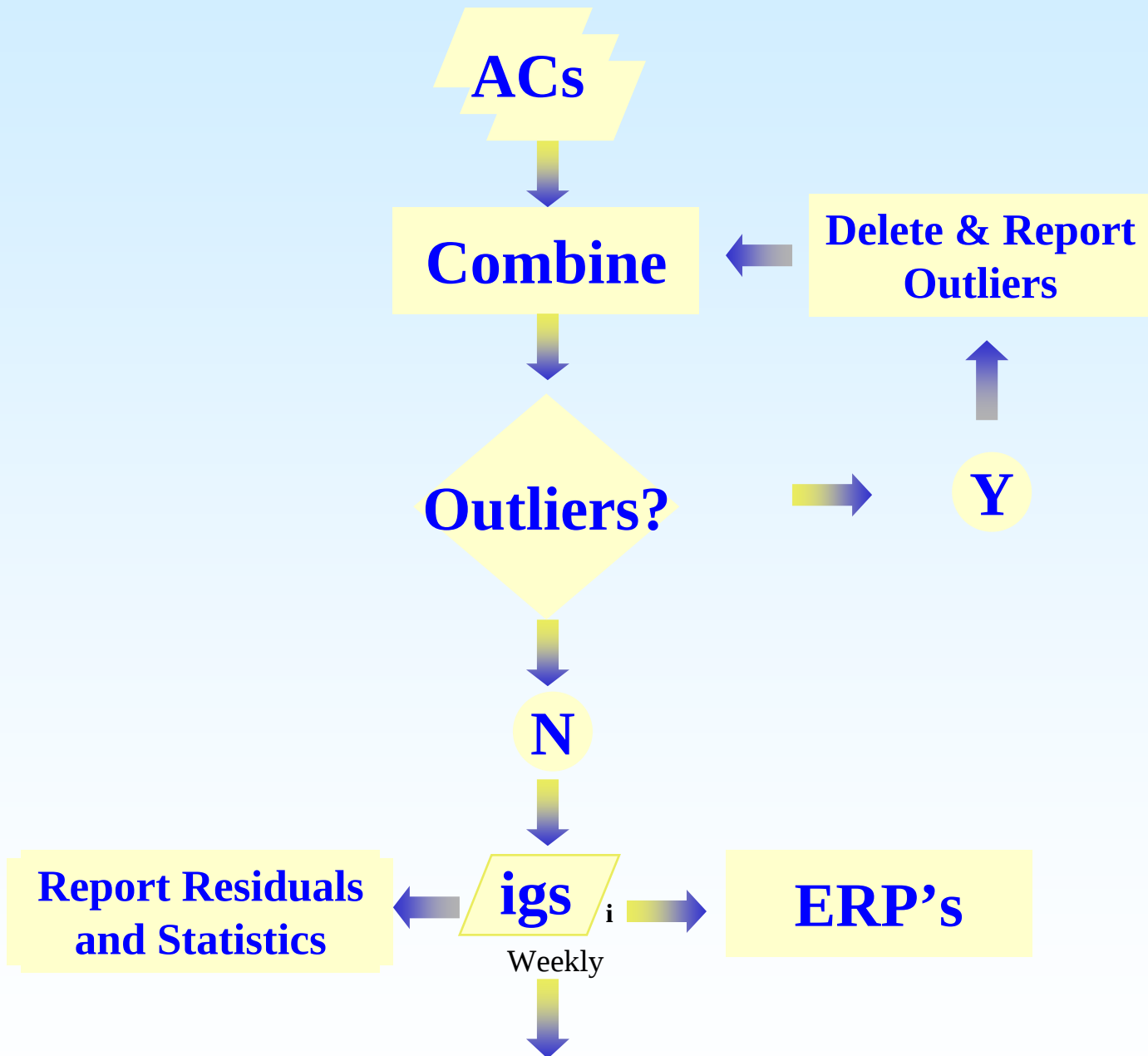


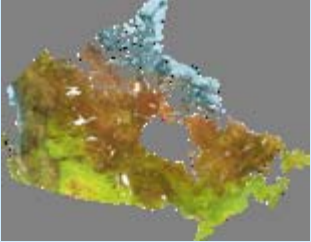
AC / GNAAC / IGS Comparison



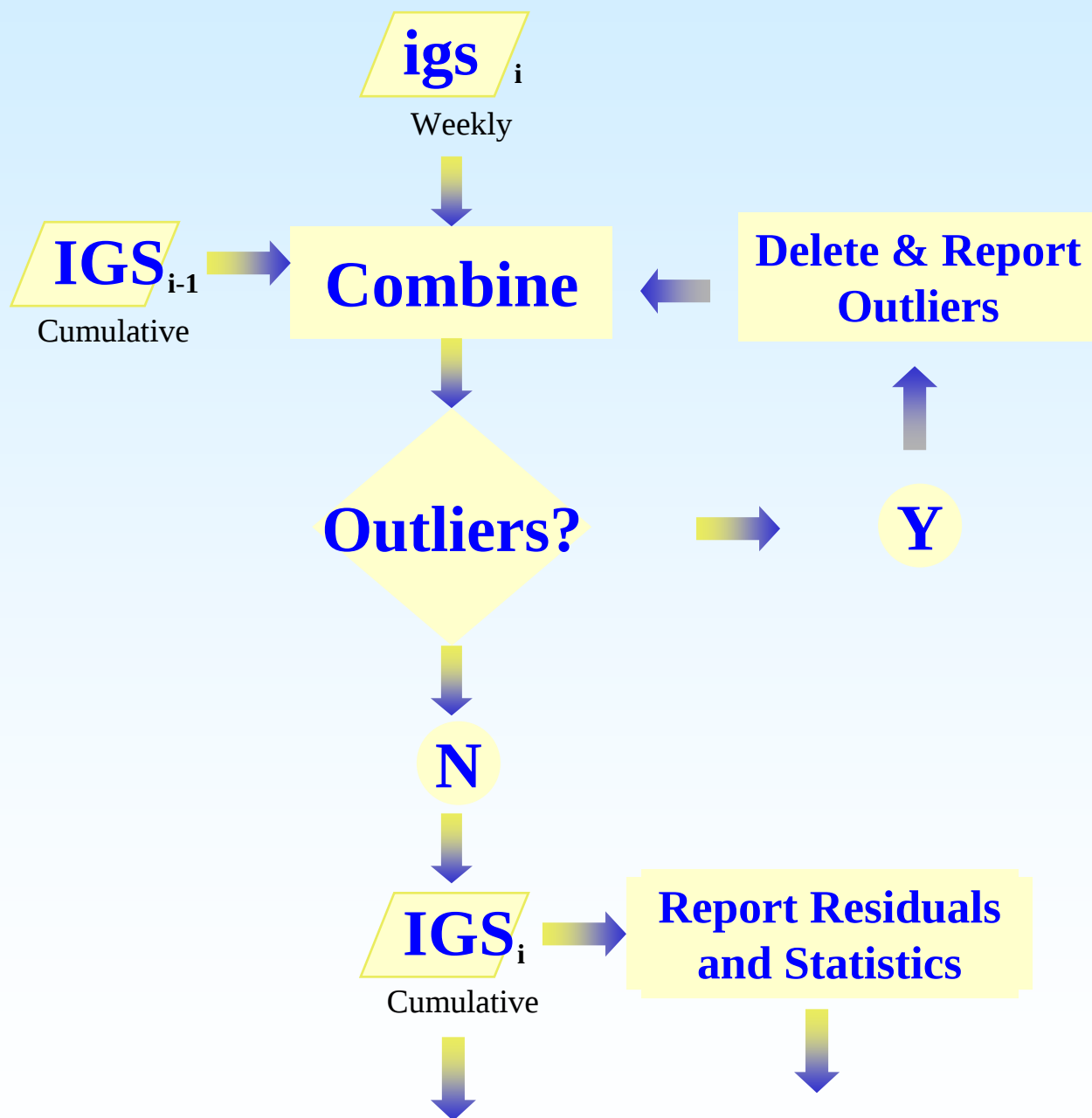


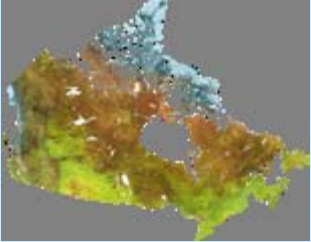
Weekly Combination





Cumulative Combination





IGS & igs Solutions

IGS_i

Cumulative



Reject stations:

- No dome #
- No or poor velocity
- ...



Apply inner constraints



IGS_i

Official
Cumulative

igs_i

Weekly



Reject stations:

- No dome #
- ...

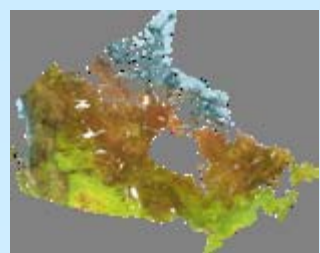


Apply inner constraints



igs_i

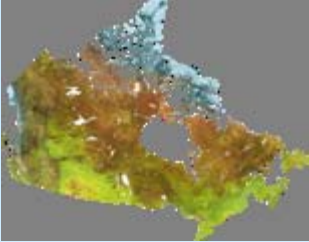
Official
Weekly



Some Issues

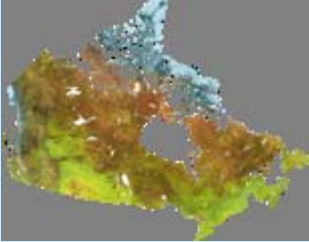
- Unremoveable Constraints
- Reuse of data
- Modeling (e.g. LODR)
- Numerical
- Software Upgrade
- Discontinuities
- Recombination





Quality Assurance

- Investigate outliers list
- Comparisons between ACs, GNAACs, ITRF, igs_{i-1} , igs_i , IGS_{i-1} , IGS_i
- Regular comparisons of IGS_i velocity field with plate motion models
- Independent check of the solutions before submission



Summary

- Products are aligned to ITRF2005
- The simultaneous combination approach ensures a unique and consistent set of station coordinates, ERP and geocenter estimates
- Consistent with the other IGS core products (Orbits, clocks)

