

Canadian National Networks

Updated National CACS
Regional CACS
CBN 2001 Reobs
GPS on BM

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Natural Resources
Canada

Ressources naturelles
Canada

CACS v4.0 (ITRF2000)

- CACS coordinates updated to ITRF2000
 - ITRF2000 significantly better than ITRF97
 - Velocities more accurate (due to more data)
 - More stations in Canada (CHWK, NANO, WSLR)
 - Americans have also updated CORS to ITRF2000
- Transformed to NAD83(CSRS)
 - TRNOBS updated to v2.7 with ITRF2000
 - Added incremental ITRF97-ITRF2000 transformation

CACS v4.0 (con't)

- Problem: Intra-plate motions
 - ITRF reference epoch 1997.0 (epoch of previous CACS)
 - Post-glacial rebound (up to 2 cm/y vert)
 - Tectonic motion on west coast (up to 1 cm/y hz & vert)
 - Significant changes over 5 years
- Propagated coordinates to 2002.0
 - Using ITRF2000 velocities
 - Average epoch of CBN re-observations
 - Americans have adopted same

CACS 4.0 (2002.0) - CACS 4.0 (1997.0)

Map showing vector differences between CACS 4.0 (2002.0) and CACS 4.0 (1997.0) for various stations in the North Pacific. The map includes latitude from 42°N to 72°N and longitude from 140°W to 60°W. Stations are marked with red and blue vectors and labeled with their names and values.

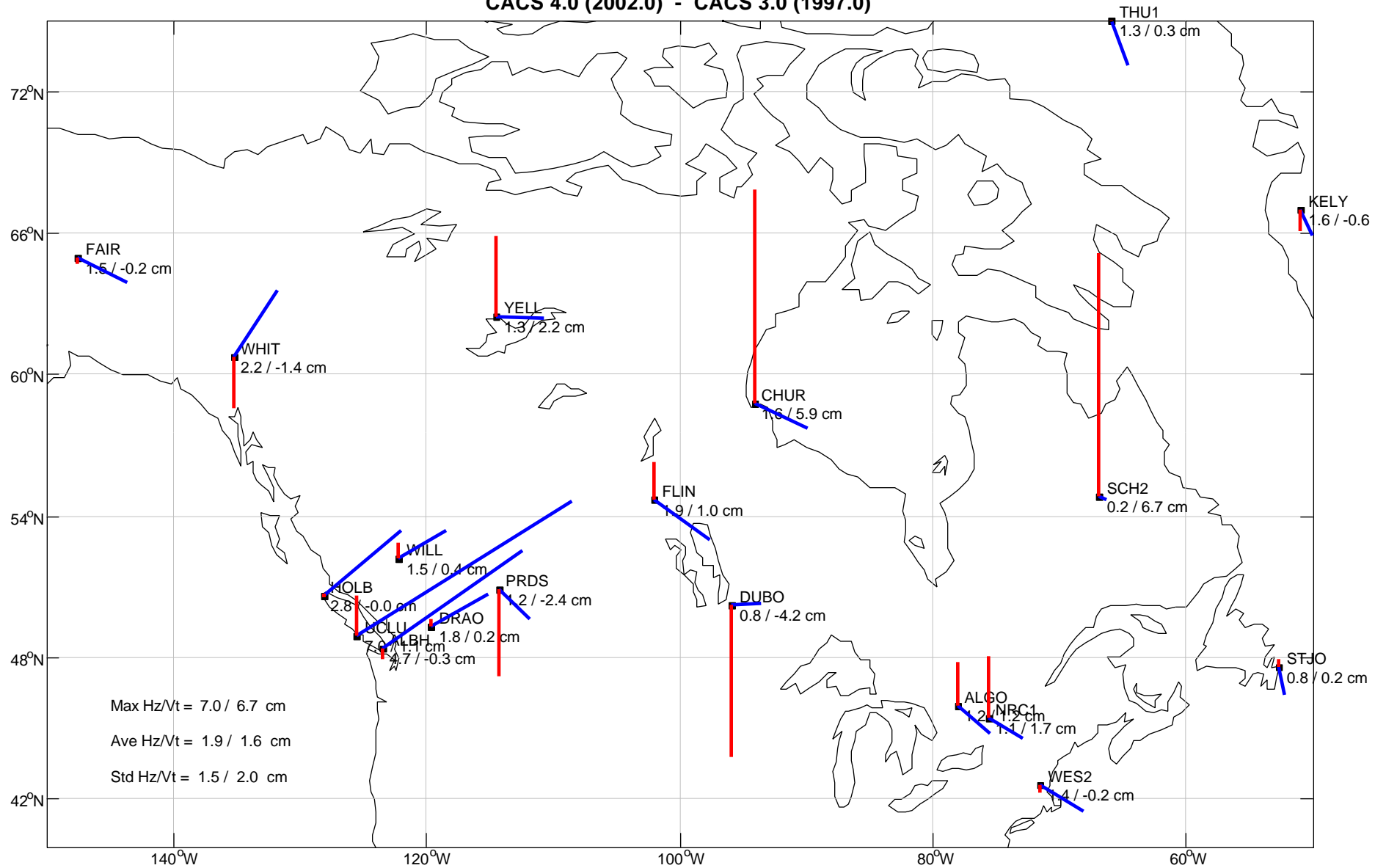
Legend:

- Max Hz/Vt = 8.1 / 5.8 cm
- Ave Hz/Vt = 2.2 / 1.9 cm
- Std Hz/Vt = 1.7 / 1.8 cm

Station Data:

Station	Value
FAIR	1.5 / -0.1 cm
WHIT	2.2 / -0.8 cm
YELL	1.3 / 2.2 cm
CHUR	1.6 / 5.8 cm
FLIN	1.8 / 1.3 cm
DURO	1.2 / -2.8 cm
WILL	1.5 / 0.4 cm
HOLB	3.0 / -0.8 cm
SLR	1.5 / 0.1 cm
PRDS	1.1 / -1.1 cm
ALGO	2.1 / 1.0 cm
NRC1	1.1 / 1.6 cm
WES2	1.1 / -0.6 cm
STJO	0.9 / 0.0 cm
SCH2	0.9 / 5.5 cm
THU1	1.4 / 0.8 cm
KELY	0.6 / -0.6 cm

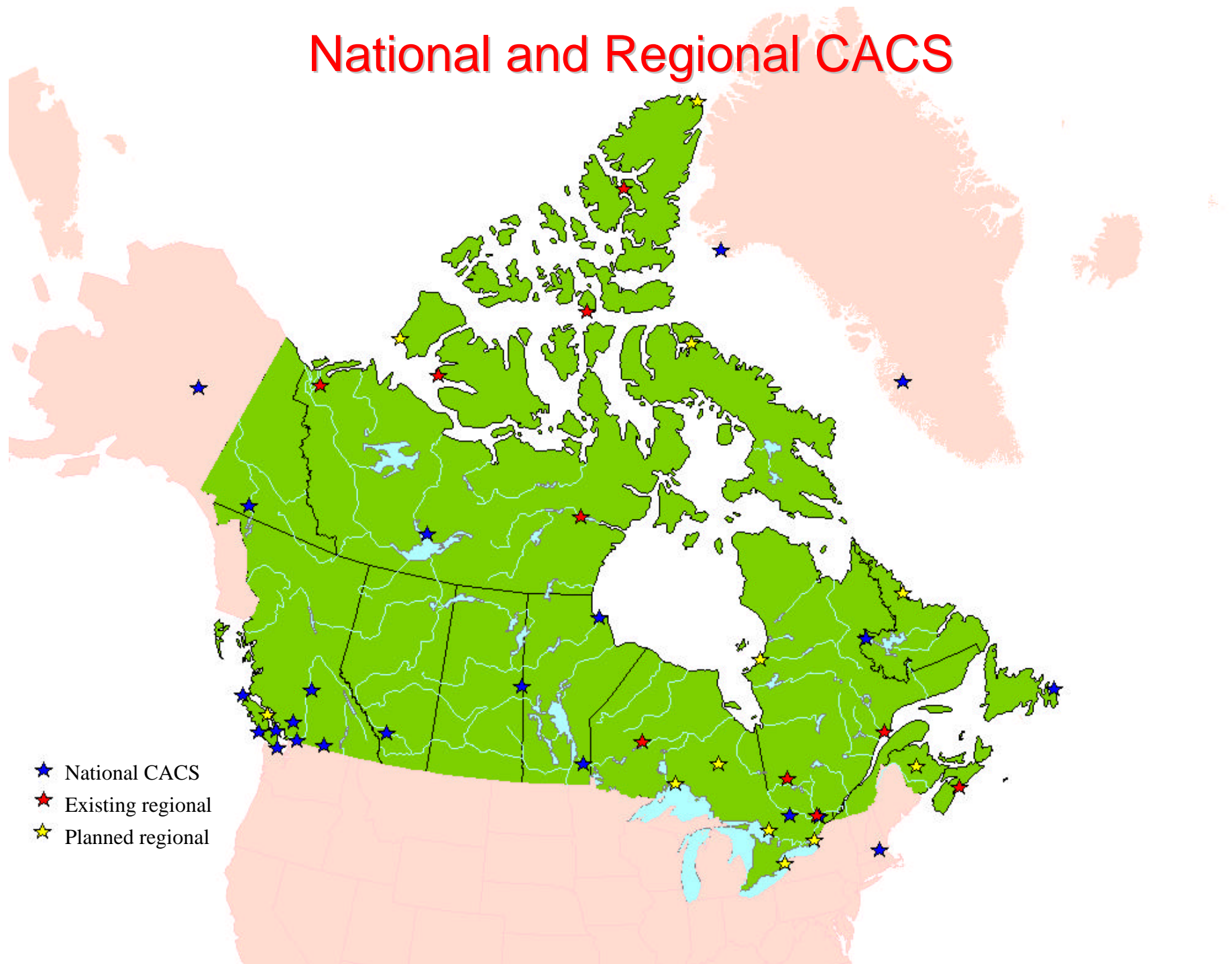
CACS 4.0 (2002.0) - CACS 3.0 (1997.0)



Regional CACS

- Existing since late 2001
 - GSD/GFZ Post-Glacial Rebound (PGR) network
 - GSD/EC GPS met station at Eureka
 - GSD/GSC Western Arctic Deformation Network (WARDEN)
- Planned
 - GSD/OSU/NGS Great Lakes CORS network – May
 - GSD/CHS GPS at Arctic Tide Gauges – July
 - New National ACP in Fredericton – TBD

National and Regional CACS



Regional CACS Solutions

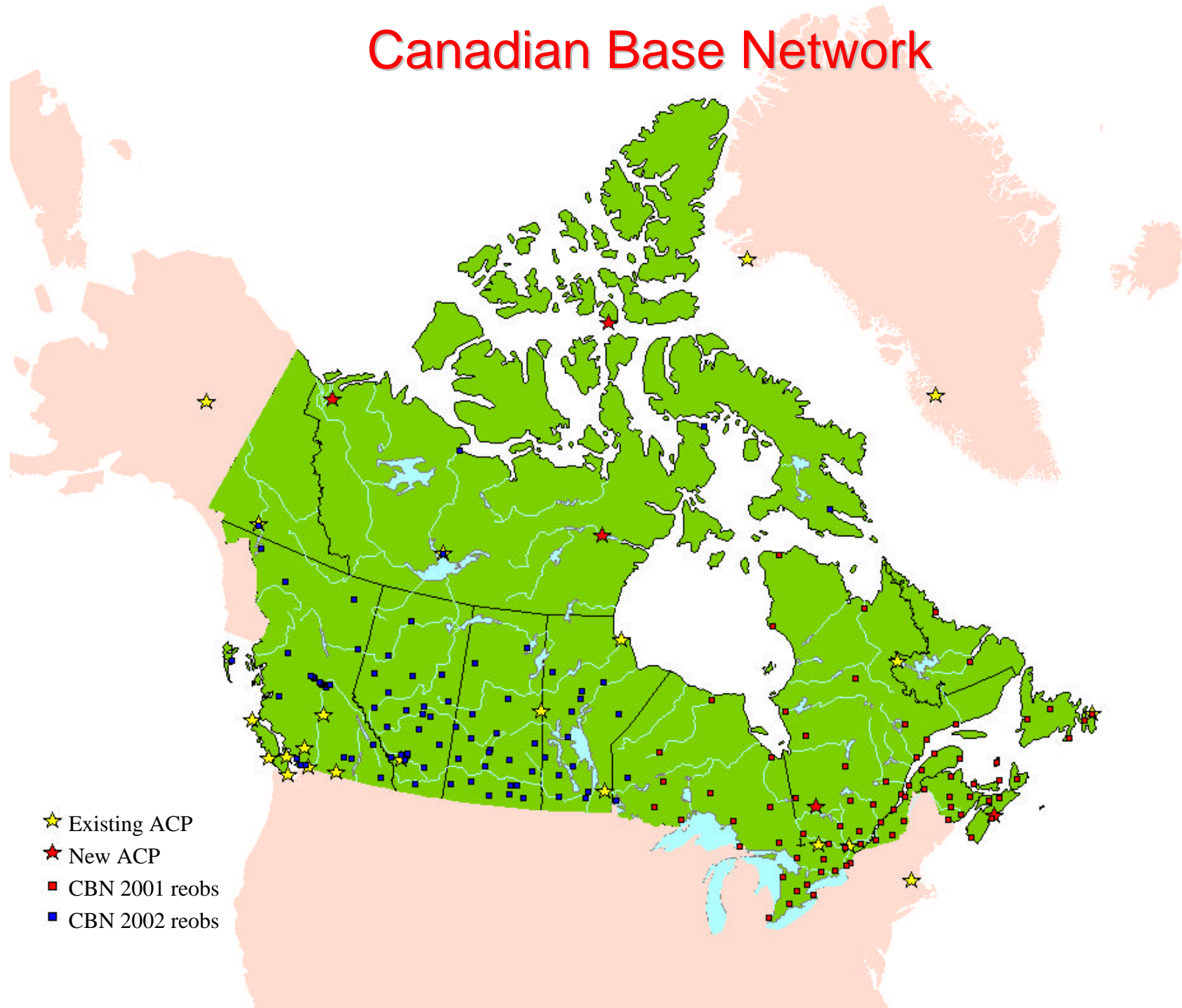
- To be included in NAREF densification
 - Weekly and cumulative ITRF/IGS solutions
 - Submit to next ITRF
- Adopt initial cumulative solution
 - Transform to NAD83(CSRS)
 - Wait as long as possible to maximum data
- Special regional solutions
 - For specific geophysical studies
 - May need special constraints

CBN 2001 Re-observations

- Re-observed eastern half of CBN
 - Occupation of only CBN stations
 - At least three independent 24 hr sessions
- Processing/Analysis
 - Bernese GPS Software with IGS precise orbits
 - Minimum constraint adjustment for analysis (ALGO fixed)
 - Will combine with CBN 2002
 - Will integrate into CACS v4.0 at 2002.0

Canadian Base Network

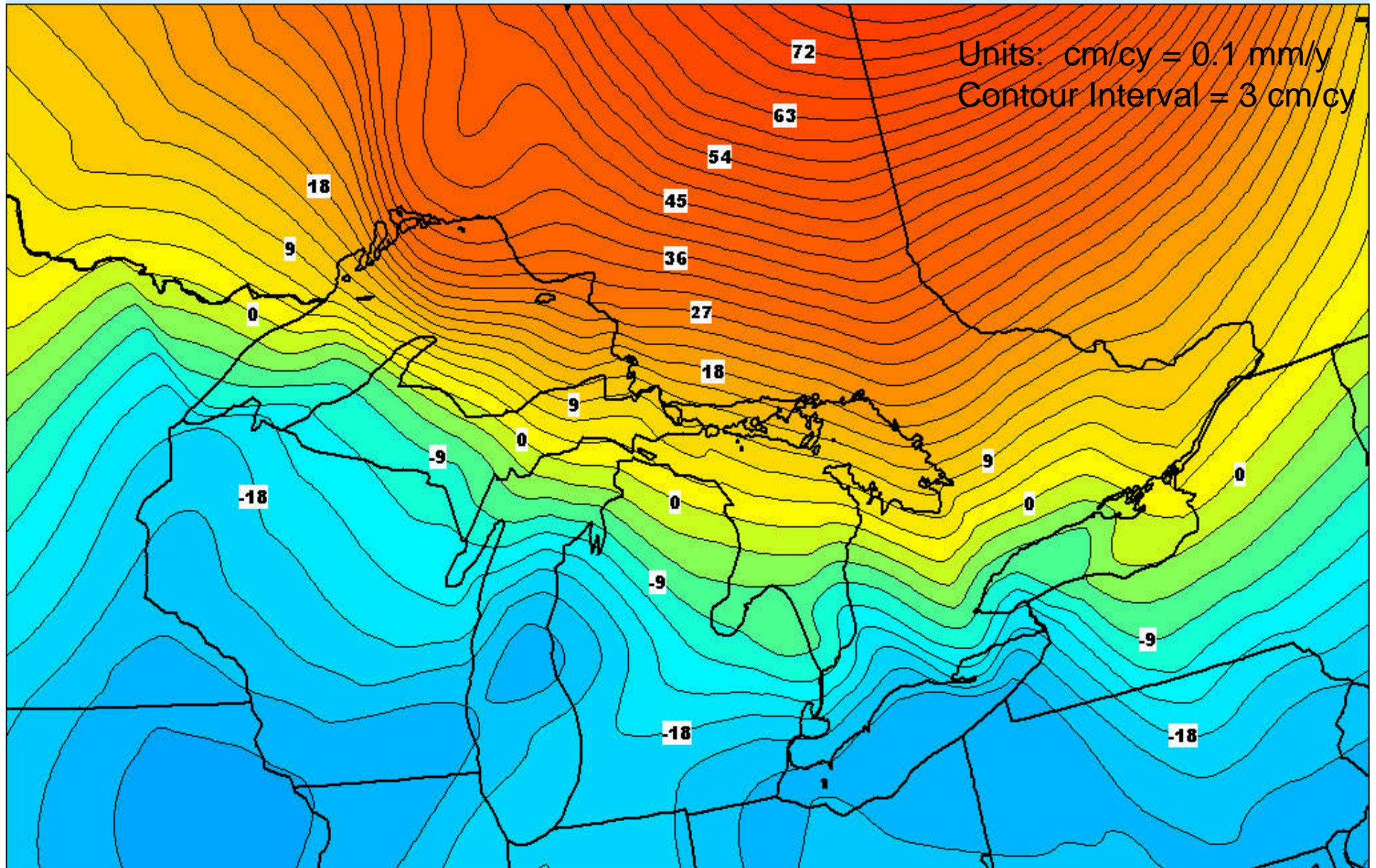
- ★ Existing ACP
- ★ New ACP
- CBN 2001 reobs
- CBN 2002 reobs



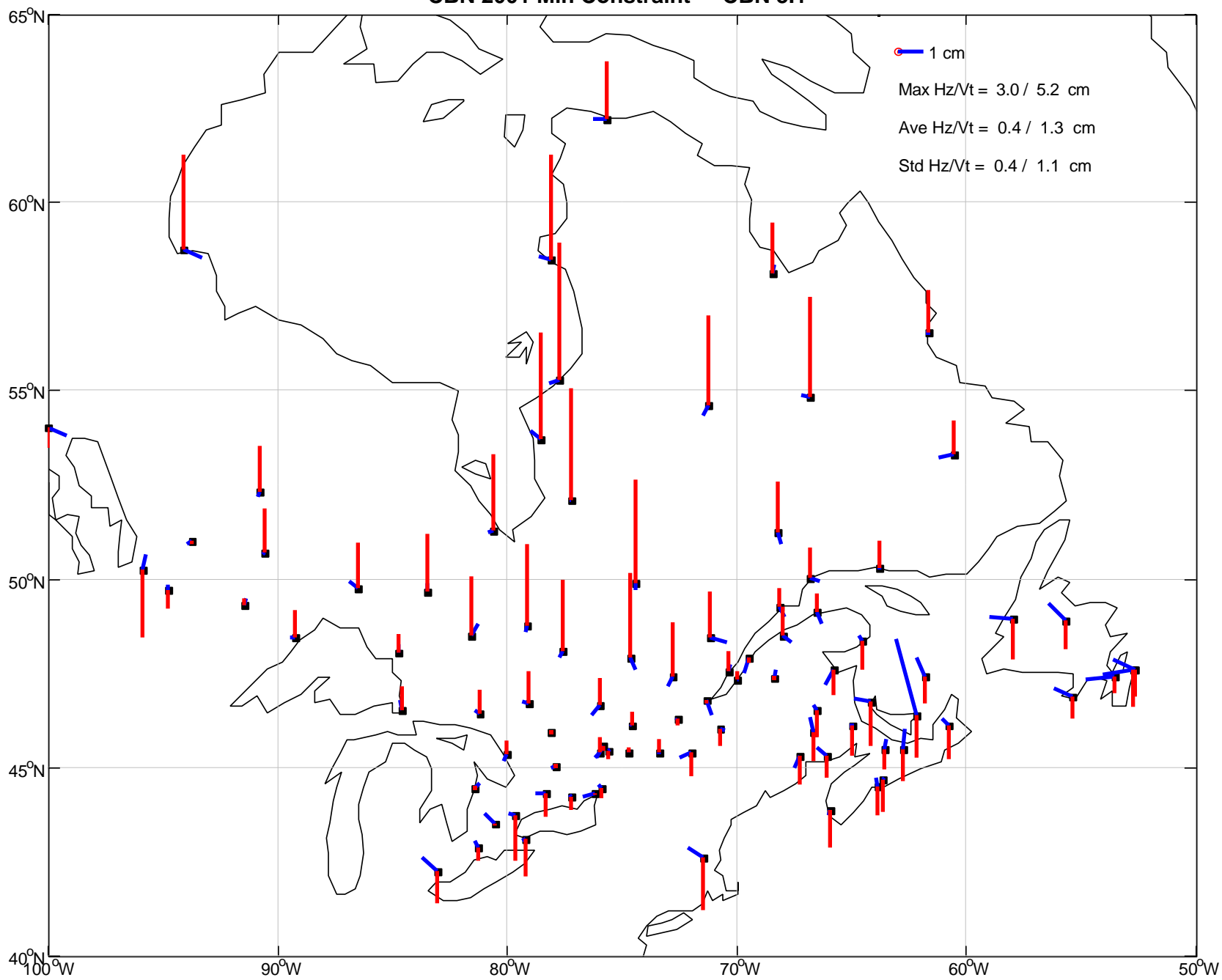
CBN 2001 Re-Observation (con't)

- Significant differences with CBN 3.1
- Post-glacial rebound
 - From 1994 to 2001 in southern Quebec
 - From 1997 to 2001 in northern Quebec and Ontario
- Apparent settlement in SW Ontario ??
 - Monuments not in bedrock
 - Heights are ~1.5 cm lower w.r.t. ALGO (1997 to 2001)
 - Similar trend elsewhere in south but not same epoch
 - Agrees with City of Toronto (“Leafs Suck”) surveys

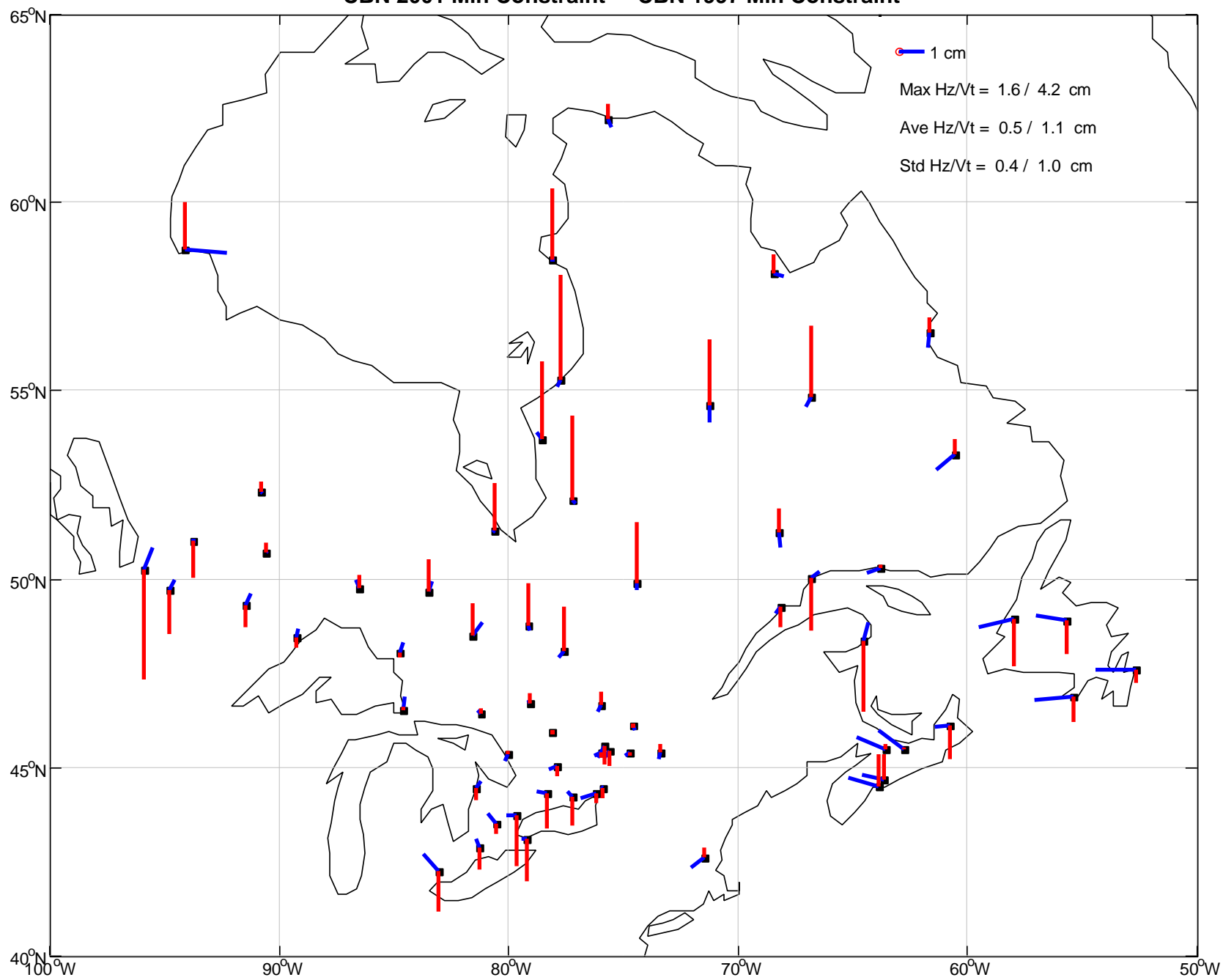
ICE-4G (VM1)



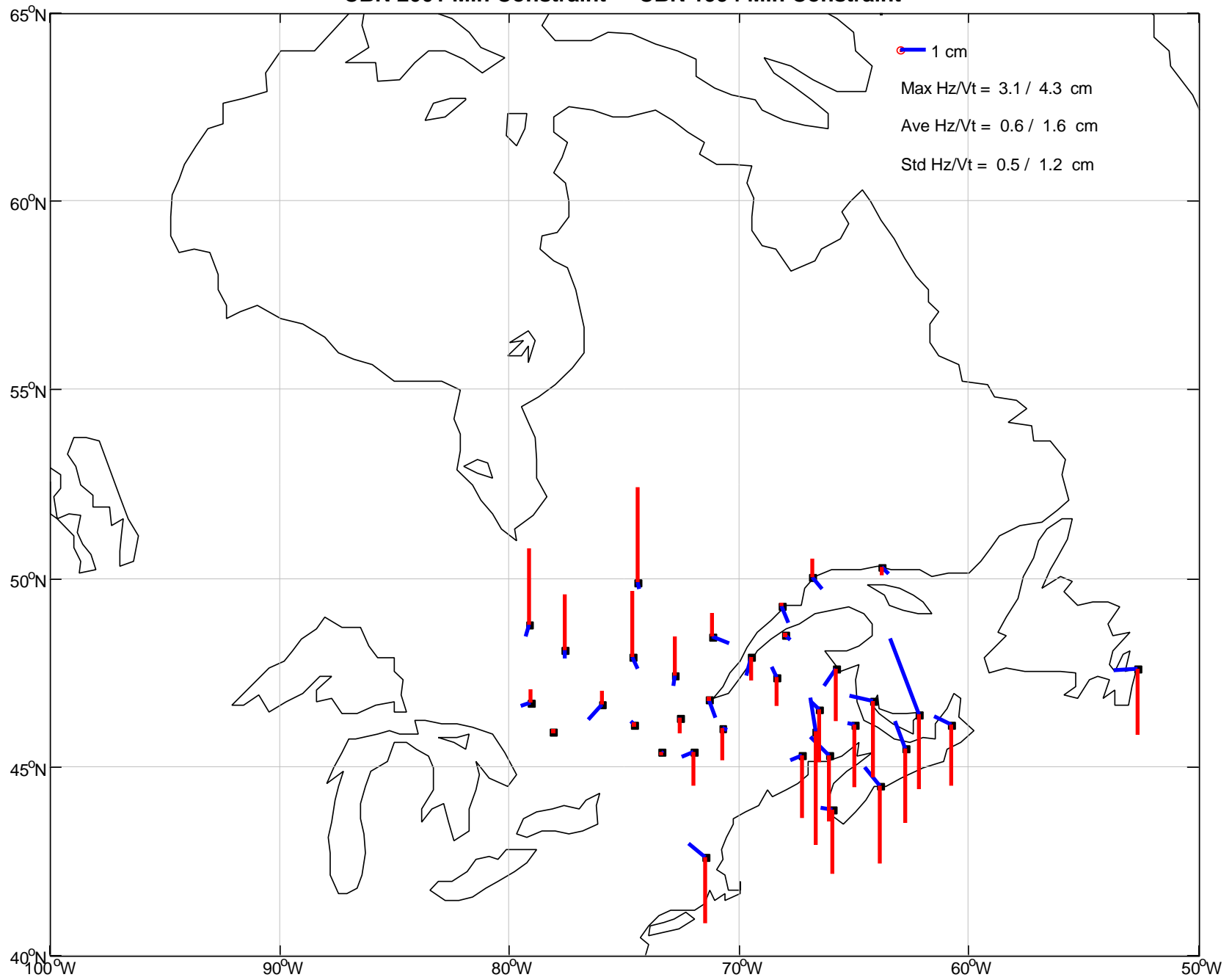
CBN 2001 Min Constraint - CBN 3.1



CBN 2001 Min Constraint - CBN 1997 Min Constraint



CBN 2001 Min Constraint - CBN 1994 Min Constraint



GPS on BM

- Supernet v3.1
 - Latest available (in CGRSC Data Archive)
 - Integrated into CBN v3.1
- Supernet v3.2
 - Nearly complete (end of May?)
 - Includes addition projects
 - Re-observations in Ontario & BC
 - CHS GPS at tide gauges in East
 - GSC surveys in Yukon & Mould Bay
 - GSD/KMS survey in Nares Strait
 - Will be integrated into CBN 3.1

GPS on BM Network

