WS0916 − Florida Straits 27°N Section

September 10−11, 2009 (13.3 hour section occupation)

- **9 LADCP velocity profiles** − single WH300 LADCP data
  LADCP data processed with Visbeck v10.8 at 10m vertical resolution...
- **143 SADCP velocity profiles** − OS75 SADCP data
  SADCP data processed with CODAS3 at 16m (OS75) vertical resolution...
- **1000m by 10m grid resolution** − along−channel velocity field
  profiles interpolated onto grid using either MATLAB *griddata* or MATLAB *gridfit*...

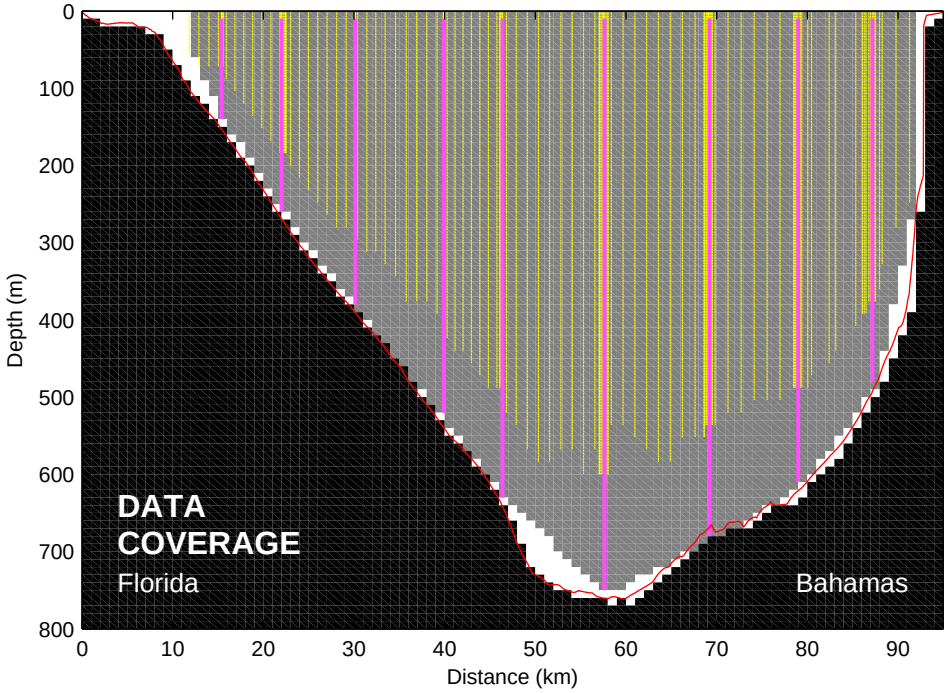
Grid Interpolation and Boundary Extrapolation:

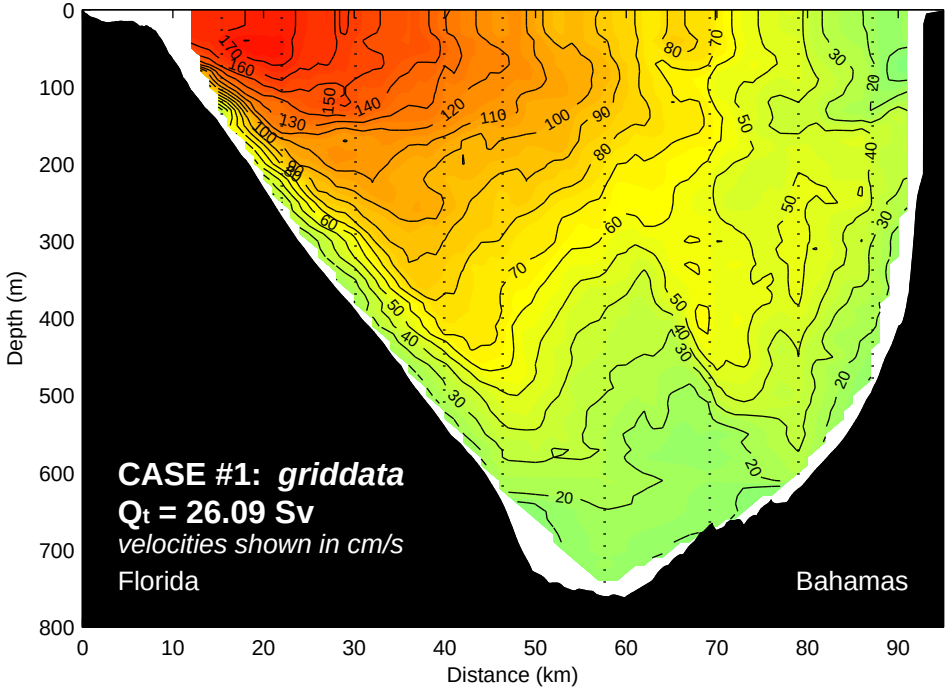
· total cross−sectional area = 43.00 km^2 (percent total area = 100%)
· cross−sectional area of gridded velocity field = 40.90 km^2 (95.12%)
· cross−sectional area of boundary (to be extrapolated) = 2.10 km^2 (4.88%)

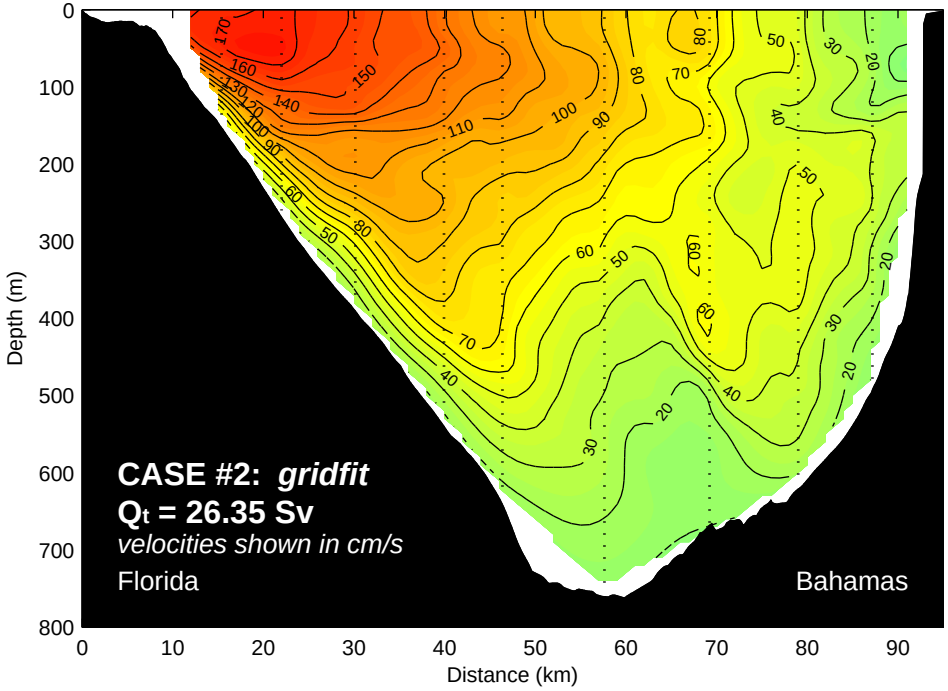
CASE #1: interp. = *griddata (linear)*, extrap. = *none*
· total detided transport (Q_t) = 26.09 Sv (1 Sv = $10^6 m^3 s^{-1}$)
· *griddata is a true interpolant (exactly predicts all supplied data)**

CASE #2: interp. = *gridfit (linear/triangles, smoothing = 0.4)*, extrap. = *none*
· total detided transport (Q_t) = 26.35 Sv
· *gridfit is NOT a true interpolant (simulates behavior of supplied data)*

CASE #1 Q_t − CASE #2 Q_t = −0.26 Sv (transport difference)







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Grid Interpolation and Boundary Extrapolation:

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· cross−sectional area of gridded velocity field = 40.90 km^2 (95.12%)
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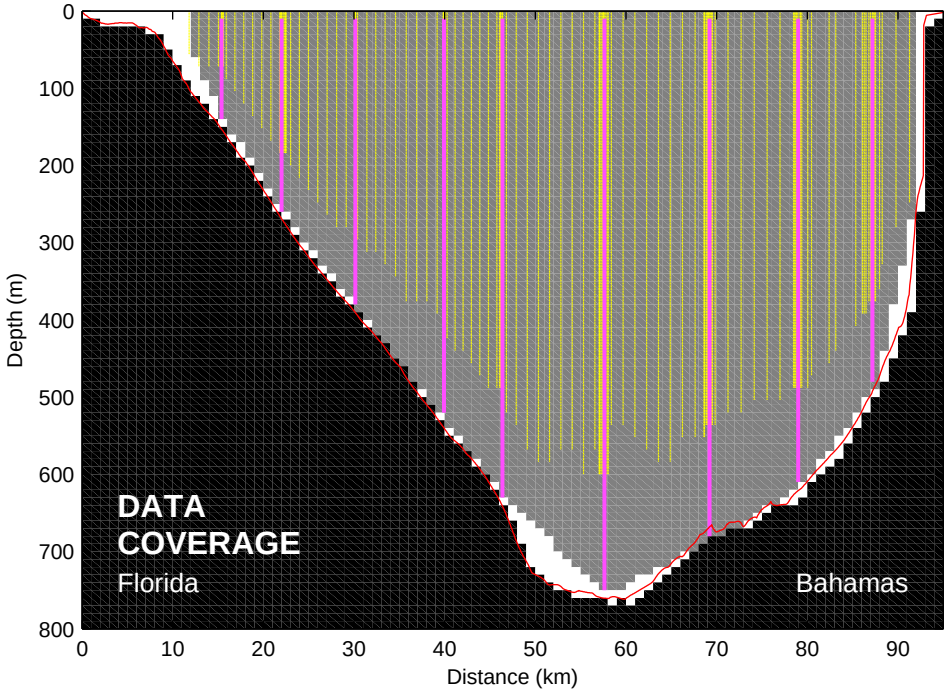
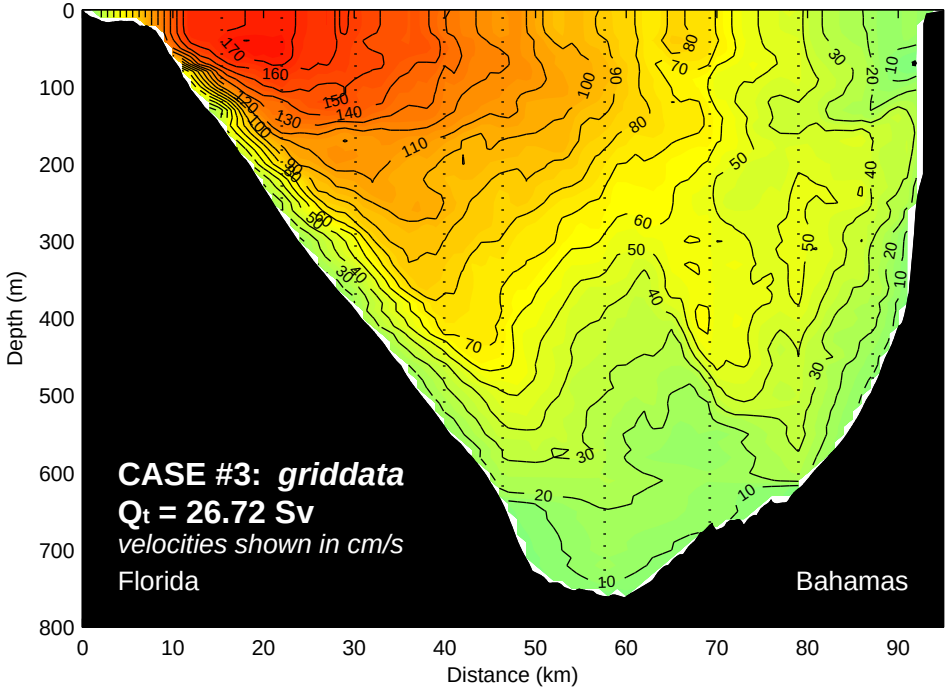
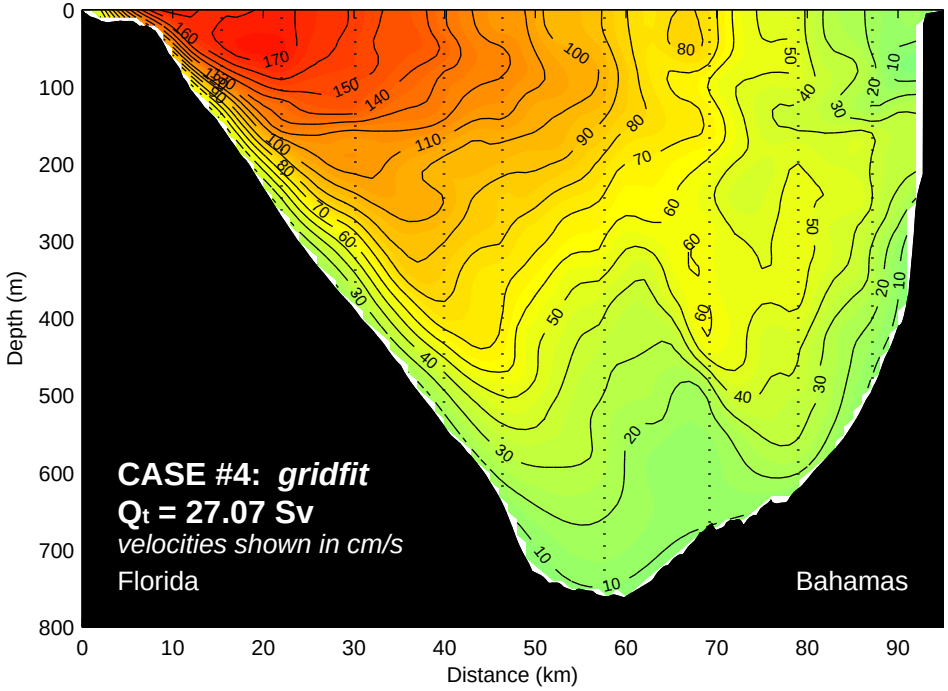
CASE #3: interp. and extrap. =*griddata (linear)*
· total detided transport (Q_t) = 26.72 Sv (1 Sv = $10^6 m^3 s^{-1}$)
· extrapolated boundary transport contribution = 0.63 Sv

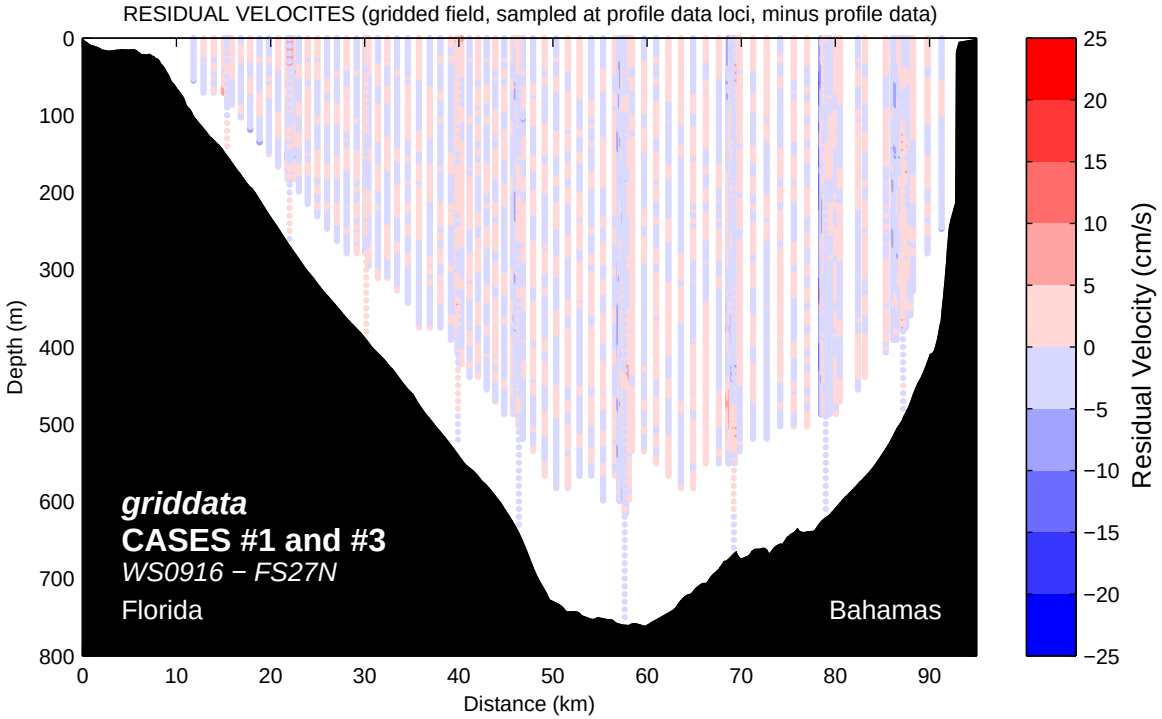
CASE #4: interp. and extrap. =*gridfit (linear/triangles, smoothing = 0.4)*
· total detided transport (Q_t) = 27.07 Sv
· extrapolated boundary transport contribution = 0.72 Sv

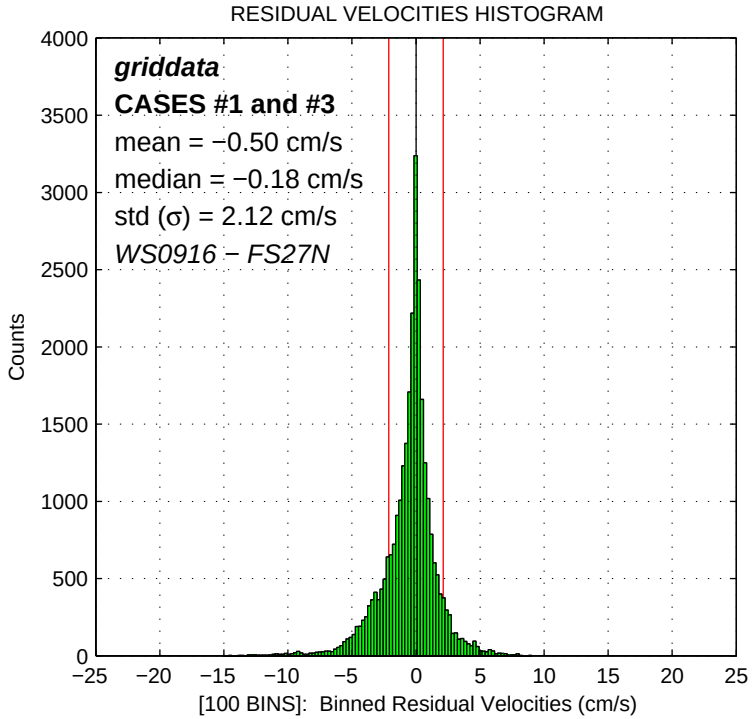
CASE #3 Q_t − CASE #4 Q_t = −0.35 Sv (transport difference)

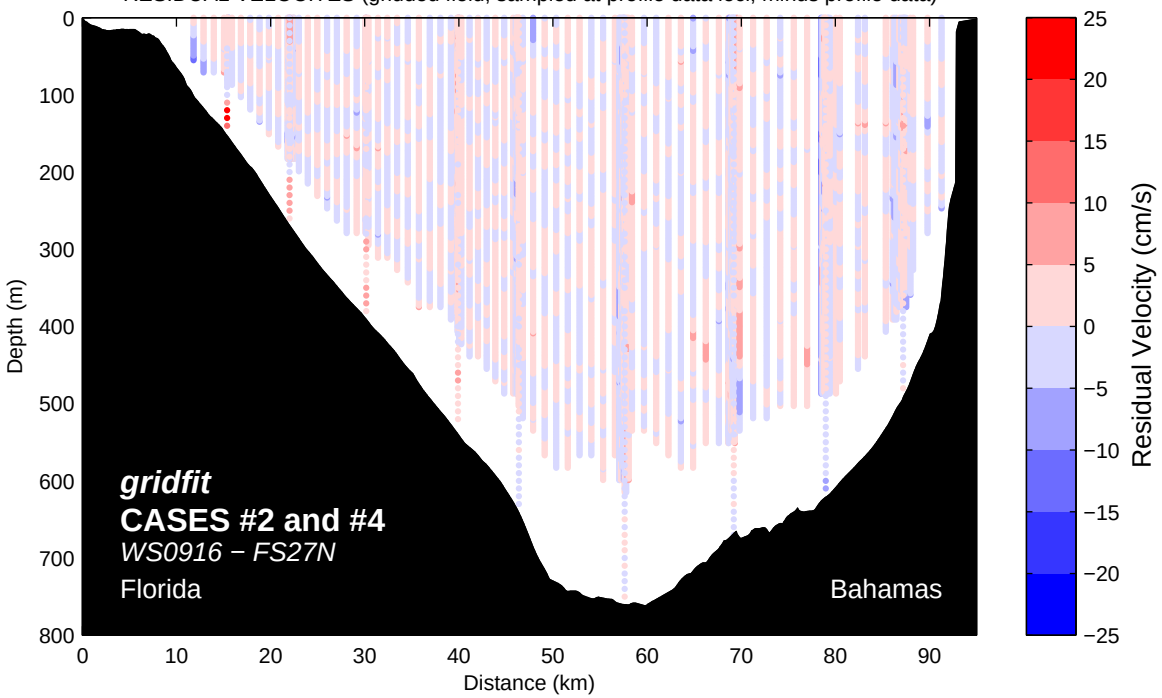


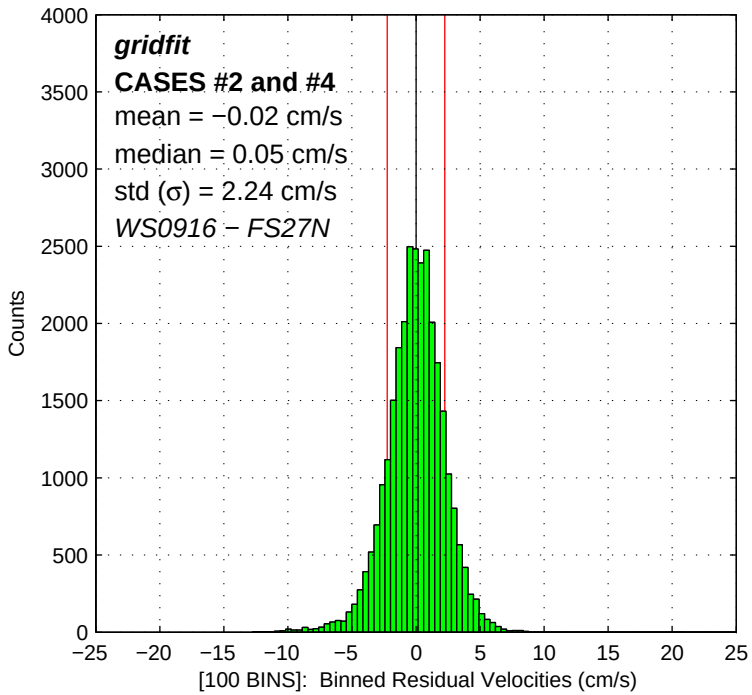





RESIDUAL VELOCITES (gridded field, sampled at profile data loci, minus profile data)
griddata
CASES #1 and #3
WS0916 − FS27N
Florida
Bahamas
Depth (m)
Distance (km)
Residual Velocity (cm/s)


RESIDUAL VELOCITIES HISTOGRAM
griddata
CASES #1 and #3
mean = −0.50 cm/s
median = −0.18 cm/s
std (σ) = 2.12 cm/s
WS0916 − FS27N
Counts
[100 BINS]: Binned Residual Velocities (cm/s)


RESIDUAL VELOCITES (gridded field, sampled at profile data loci, minus profile data)
gridfit
CASES #2 and #4
WS0916 − FS27N
Florida
Bahamas
Depth (m)
Distance (km)
Residual Velocity (cm/s)


RESIDUAL VELOCITIES HISTOGRAM
gridfit
CASES #2 and #4
mean = −0.02 cm/s
median = 0.05 cm/s
std (σ) = 2.24 cm/s
WS0916 − FS27N
Counts
[100 BINS]: Binned Residual Velocities (cm/s)

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