0.1 1993-01

1. Problems
   (a) No issues running
   (b) Archived
2. Results
   (a) Level 1
      i. - Map
         A. - Max = 15.65-m, Mean = 6.88-m, U10 = 32.23-m/s
      ii. - Validation
         A. - Southern buoys had one large event with wave heights near 6-m on the 27th while the northern buoys had consistent larger wave events throughout the month. The trend is a negative bias at the peaks of each event.
   (b) Level 2
      i. - Map
         A. - Max = 10.70-m, Mean = 3.67-m, U10 = 28.39-m/s
      ii. - Validation
         A. - Similar to level 1
   (c) Level 3N
      i. - Map
         A. - Max = 5.64-m, Mean = 2.77-m, U10 = 21.96-m/s
      ii. - Validation
         A. - 44005 - negative bias
         B. - 44007 - not enough data
         C. - 44013 - low at peak on 15th by 1-m
   (d) Level 3C
      i. - Map
         A. - Max = 5.72-m, Mean = 2.44-m, U10 = 22.23-m/s
      ii. - Validation
         A. - 44014 - pretty good fit

B. - 44056 - phase issues

(e) Level 3S1

i. - Map

A. - Max = 5.96-m, Mean = 2.50-m, U10 = 22.23-m/s

ii. - Validation

A. - 41002 - negative bias at peak on 27th

B. - 41009 - positive bias through month, but negative bias at the peak

C. - 41010 - similar to 41009

(f) Level 3S2

i. - Map

A. - Max = 5.67-m, Mean = 2.60-m, U10 = 19.90-m/s

ii. - Validation

A. - 41009 - positive bias through the month, but low by 2-m at the peak.

0.2 1993-02

1. Problems

(a) No issues running

(b) Archived

2. Results

(a) Level 1

i. - Map

A. - Max = 12.76-m, Mean = 5.05-m, U10 = 29.02-m/s

ii. - Validation

A. - Mild wave month for southern buoys, with the largest wave conditions being measured up north. The trend is similar to previous months with an under-estimation of wave heights at the peaks.

(b) Level 2

i. - Map
   A. - Max = 12.62-m, Mean = 3.59-m, U10 = 28.23-m/s
ii. - Validation
   A. - Similar to level 1

(c) Level 3N
i. - Map
   A. - Max = 11.02-m, Mean = 3.13-m, U10 = 24.92-m/s
ii. - Validation
   A. - 44005 - negative bias
   B. - 44007 - negative bias
   C. - 44013 - low at all peaks

(d) Level 3C
i. - Map
   A. - Max = 5.32-m, Mean = 2.59-m, U10 = 19.31-m/s
ii. - Validation
   A. - 44014 - no trend, negative bias at high waves, positive bias at low waves
   B. - 44056 - similar to 44014

(e) Level 3S1
i. - Map
   A. - Max = 4.98-m, Mean = 2.55-m, U10 = 19.31-m/s
ii. - Validation
   A. - 41002 - low at peaks
   B. - 41009 - positive bias
   C. - 41010 - low at each peak, but positive bias early in month

(f) Level 3S2
i. - Map
   A. - Max = 4.34-m, Mean = 2.12-m, U10 = 16.17-m/s
ii. - Validation
   A. - 41009 - positive bias

0.3 1993-03

1. Problems
    (a) No issues running
    (b) Archived
2. Results
    (a) Level 1
        i. - Map
            A. - Max = 15.19-m, Mean = 5.07-m, U10 = 30.57-m/s
        ii. - Validation
            A. - The dominating trend for the month is a large wave event occurring between the 13th and the 16th with wave heights ¿ 10-m. The results tend to have the model underestimating the peak at most buoy locations.
    (b) Level 2
        i. - Map
            A. - Max = 15.24-m, Mean = 3.32-m, U10 = 31.90-m/s
        ii. - Validation
            A. - Similar to level 1
    (c) Level 3N
        i. - Map
            A. - Max = 14.61-m, Mean = 2.93-m, U10 = 28.59-m/s
        ii. - Validation
            A. - 44005 - negative bias
            B. - 44007 - low on both peaks during the month
            C. - 44013 - similar to 44007
    (d) Level 3C
        i. - Map
            A. - Max = 13.01-m, Mean = 2.70-m, U10 = 31.90-m/s
        ii. - Validation
            A. - 44014 - seems to almost capture the event on 14th. A few data points are higher than the model.

B. - 44056 - the wave heights are there but the phase off, especially with the wave height attenuation

(e) Level 3S1

i. - Map

A. - Max = 11.54-m, Mean = 2.67-m, U10 = 31.17-m/s

ii. - Validation

A. - 41002 - low on largest peak by 5-m (peak at +15-m)

B. - 41009 - peak on 19th was over-estimated

C. - 41010 - low on 14th peak by 2-m

(f) Level 3S2

i. - Map

A. - Max = 6.88-m, Mean = 2.20-m, U10 = 25.26-m/s

ii. - Validation

A. - 41009 - good fit early, but high on peak event on the 19th.

0.4 1993-04

1. Problems

(a) No issues running

(b) Archived

2. Results

(a) Level 1

i. - Map

A. - Max = 10.84-m, Mean = 3.41-m, U10 = 27.14-m/s

ii. - Validation

A. - A couple good sized events during the month with the same general trend. Model results under-estimate the wave height at the peak of the events.

(b) Level 2

i. - Map

A. - Max = 6.49-m, Mean = 2.88-m, U10 = 22.55-m/s

ii. - Validation

A. - Similar to level 1

(c) Level 3N

i. - Map

A. - Max = 5.00-m, Mean = 2.38-m, U10 = 22.08-m/s

ii. - Validation

A. - 44005 - negative bias

B. - 44007 - negative bias

C. - 44011 - negative bias

D. - 44013 - negative bias

(d) Level 3C

i. - Map

A. - Max = 5.92-m, Mean = 2.26-m, U10 = 17.84-m/s

ii. - Validation

A. - 44014 - good fit

B. - 44056 - good fit

(e) Level 3S1

i. - Map

A. - Max = 4.77-m, Mean = 2.22-m, U10 = 17.84-m/s

ii. - Validation

A. - 41002 - good fit, slightly low at early peak

B. - 41009 - positive bias

C. - 41010 - good fit, a little low at times

(f) Level 3S2

i. - Map

A. - Max = 3.40-m, Mean = 1.82-m, U10 = 15.80-m/s

ii. - Validation

A. - 41009 - positive bias

0.5 1993-05

1. Problems
   (a) No issues running
   (b) Archived
2. Results
   (a) Level 1
      i. - Map
         A. - Max = 8.27-m, Mean = 2.88-m, U10 = 24.25-m/s
         B. - One storm track south of Florida
      ii. - Validation
         A. - Low wave height month with waves less than 4-m. The wave height trend through the month is followed at most buoys, but there is still some under-estimation of the small peaks. Not a lot to cause huge errors
   (b) Level 2
      i. - Map
         A. - Max = 5.47-m, Mean = 2.33-m, U10 = 19.94-m/s
         B. - One storm track heading out of Gulf of Mexico and through the Bahamas
      ii. - Validation
         A. - Similar to level 1
   (c) Level 3N
      i. - Map
         A. - Max = 2.72-m, Mean = 1.59-m, U10 = 14.12-m/s
      ii. - Validation
         A. - 44005 - negative bias
         B. - 44007 - negative bias
         C. - 44011 - small waves but missing some of trend
         D. - 44013 - low on only peak during month
   (d) Level 3C

i. - Map
   A. - Max = 2.39-m, Mean = 1.26-m, U10 = 11.98-m/s
ii. - Validation
   A. - 44009 - decent fit
   B. - 44014 - good fit
   C. - 44056 - good fit

(e) Level 3S1
   i. - Map
      A. - Max = 2.41-m, Mean = 1.24-m, U10 = 11.41-m/s
   ii. - Validation
      A. - 41002 - low on peaks
      B. - 41009 - good fit, slightly positive bias
      C. - 41010 - good fit

(f) Level 3S2
   i. - Map
      A. - Max = 2.40-m, Mean = 1.45-m, U10 = 12.11-m/s
      B. - One track going through Bahamas out to offshore
   ii. - Validation
      A. - 41009 - slight positive bias

0.6 1993-06

1. Problems
   (a) No issues running
   (b) Archived
2. Results
   (a) Level 1
      i. - Map
         A. - Max = 6.81-m, Mean = 2.69-m, U10 = 21.78-m/s
         B. - One storm track going through Bahamas
      ii. - Validation

A. - Small wave height month, with all waves at buoys less than 4-m. Similar trend to previous months with underestimation most peak wave heights, especially at the northern buoy locations.

(b) Level 2

i. - Map

A. - Max = 4.92-m, Mean = 1.99-m, U10 = 19.93-m/s

B. - One storm south of Florida

ii. - Validation

A. - Similar to level 1

(c) Level 3N

i. - Map

A. - Max = 2.62-m, Mean = 1.17-m, U10 = 16.51-m/s

ii. - Validation

A. - 44005 - negative bias

B. - 44007 - negative bias

C. - 44011 - low at all peaks

D. - 44013 - negative bias

(d) Level 3C

i. - Map

A. - Max = 1.84-m, Mean = 1.04-m, U10 = 12.50-m/s

ii. - Validation

A. - 44009 - small waves but decent fit

B. - 44014 - a little low on peaks, wave direction looks good

C. - 44056 - slightly low on peaks

(e) Level 3S1

i. - Map

A. - Max = 2.31-m, Mean = 1.09-m, U10 = 11.20-m/s

ii. - Validation

A. - 41002 - low on peaks

B. - 41009 - slightly positively bias

C. - 41010 - good fit

(f) Level 3S2

i. - Map

A. - Max = 2.45-m, Mean = 1.25-m, U10 = 12.09-m/s

B. - One track coming out of Gulf through Bahamas

ii. - Validation

A. - 41009 - positive bias

0.7 1993-07

1. Problems

(a) No issues running

(b) Archived

2. Results

(a) Level 1

i. - Map

A. - Max = 5.21-m, Mean = 2.42-m, U10 = 17.90-m/s

ii. - Validation

A. - pretty lame month again. One event occurred on the 21st with wave heights near 4-m was measured at the central coast locations. The model under-estimated the peak by ¿ 1-m at all locations that measured the event.

(b) Level 2

i. - Map

A. - Max = 4.35-m, Mean = 1.51-m, U10 = 18.28-m/s

ii. - Validation

A. - Similar to level 1

(c) Level 3N

i. - Map

A. - Max = 2.18-m, Mean = 0.95-m, U10 = 13.29-m/s

ii. - Validation

A. - 44005 - negative bias

B. - 44007 - low on peak on the 21st
C. - 44011 - low on peak on th 21st by 2-m
D. - 44013 - low on peak

(d) Level 3C

i. - Map

A. - Max = 1.77-m, Mean = 0.86-m, U10 = 12.18-m/s

ii. - Validation

A. - 44009 - good fit
B. - 44014 - good fit, but slight positive bias
C. - 44056 - good fit

(e) Level 3S1

i. - Map

A. - Max = 1.46-m, Mean = 0.88-m, U10 = 10.82-m/s

ii. - Validation

A. - 41002 - small waves but negative bias
B. - 41009 - small waves but positive bias
C. - 41010 - good fit

(f) Level 3S2

i. - Map

A. - Max = 1.97-m, Mean = 1.15-m, U10 = 8.85-m/s

ii. - Validation

A. - 41009 - positive bias

0.8 1993-08

1. Problems

(a) No issues running
(b) Archived

2. Results

(a) Level 1

i. - Map

A. - Max = 11.34-m, Mean = 2.19-m, U10 = 27.61-m/s

B. - 4 storm tracks, one came close to OBX.

ii. - Validation

A. - Main event of the month occurred near the end of the month on the 31st. The storm created waves near 5-m. The model results over-estimated the storm at most of our buoy locations. The rest of the month was uneventful.

(b) Level 2

i. - Map

A. - Max = 12.04-m, Mean = 1.55-m, U10 = 34.56-m/s

B. - One storm track came close to OBX

ii. - Validation

A. - Similar to level 1

(c) Level 3N

i. - Map

A. - Max = 3.00-m, Mean = 1.06-m, U10 = 13.09-m/s

ii. - Validation

A. - 44005 - negative bias

B. - 44007 - good fit, looks like a little low as the storm grows

C. - 44011 - negative bias

D. - 44013 - negative bias

(d) Level 3C

i. - Map

A. - Max = 11.70-m, Mean = 1.36-m, U10 = 35.05-m/s

B. - One storm track coming close to OBX

ii. - Validation

A. - 44009 - low on first peak, but very high as storm increases at the end of the month

B. - 44014 - good fit, a little high as storm increases

C. - 44056 - similar to 44014

(e) Level 3S1

i. - Map

A. - Max = 9.03-m, Mean = 1.30-m, U10 = 28.59-m/s

ii. - Validation

A. - 41002 - high on storm peak, 31st

B. - 41009 - similar to 41002

C. - 41010 - good height on storm peak but waves stay up in the model, not in the measurements.

(f) Level 3S2

i. - Map

A. - Max = 3.85-m, Mean = 1.33-m, U10 = 13.29-m/s

ii. - Validation

A. - 41009 - positive bias

0.9 1993-09

1. Problems

   (a) No issues running

   (b) Archived

2. Results

   (a) Level 1

   i. - Map

   A. - Max = 11.77-m, Mean = 2.89-m, U10 = 28.09-m/s

   B. - 4 storm tracks with the leftover from the track that went by the OBX last month

   ii. - Validation

   A. - Largest event during the month was from the same storm that impacted many buoy sites at the end of last month. Buoy 44004 had a measured wave height ¿ 9m, and the model was very close to 9-m. The wave heights measured over 6-m were fit well by the model, but small peaks were both under-estimated and over-estimated.

   (b) Level 2

   i. - Map

A. - Max = 12.11-m, Mean = 1.88-m, U10 = 34.94-m/s
B. - 4 storm tracks in domain

ii. - Validation
A. - Similar to level 1

(c) Level 3N

i. - Map
A. - Max = 7.15-m, Mean = 1.34-m, U10 = 21.39-m/s

ii. - Validation
A. - 44005 - negative bias
B. - 44007 - low at peaks
C. - 44011 - high for peak on 2nd, low for rest of the peaks
D. - 44013 - low at peaks

(d) Level 3C

i. - Map
A. - Max = 10.87-m, Mean = 1.23-m, U10 = 35.30-m/s
B. - one storm track close to OBX

ii. - Validation
A. - 44009 - ¿ 2-m high on peak on th 1st
B. - 44014 - good fit, including 8-m peak on 1st
C. - 44056 - buoy was out at peak of event on 1st

(e) Level 3S1

i. - Map
A. - Max = 2.99-m, Mean = 1.19-m, U10 = 11.82-m/s

ii. - Validation
A. - 41002 - good fit
B. - 41009 - positive bias
C. - 41010 - good fit

(f) Level 3S2

i. - Map
A. - Max = 2.57-m, Mean = 1.34-m, U10 = 10.69-m/s

ii. - Validation
A. - 41009 - positive bias

0.10 1993-10

1. Problems
   (a) No issues running
   (b) Archived
2. Results
   (a) Level 1
      i. - Map
         A. - Max = 11.69-m, Mean = 3.52-m, U10 = 33.50-m/s
      ii. - Validation
         A. - Active wave height month with an event measured at a lot of buoys on the 28th. Wave heights near 6-m were measured and the model results tend to be low. Buoy 44008 had good agreement between model and measured during this storm but the rest were under-estimated.
   (b) Level 2
      i. - Map
         A. - Max = 8.20-m, Mean = 2.75-m, U10 = 24.20-m/s
      ii. - Validation
         A. - Similar to level 1
   (c) Level 3N
      i. - Map
         A. - Max = 5.68-m, Mean = 1.99-m, U10 = 19.84-m/s
      ii. - Validation
         A. - 44005 - negative bias
         B. - 44007 - low on every peak
         C. - 44011 - not enough data
         D. - 44013 - low on each peak
   (d) Level 3C
      i. - Map
         A. - Max = 5.84-m, Mean = 1.78-m, U10 = 19.02-m/s

ii. - Validation

A. - 44009 - pretty good fit, slightly low on 28th peak

B. - 44014 - ¿2-m low on 28th peak

C. - 44056 - similar to 44014

(e) Level 3S1

i. - Map

A. - Max = 4.51-m, Mean = 1.77-m, U10 = 17.09-m/s

ii. - Validation

A. - 41002 - good fit early, negative bias later in month

B. - 41009 - low on peak on 7th, positive bias rest of the month

C. - 41010 - low on all peaks

(f) Level 3S2

i. - Map

A. - Max = 2.74-m, Mean = 1.43-m, U10 = 15.70-m/s

ii. - Validation

A. - 41009 - low on peak on the 7th, good fit (slight positive bias) rest of the month

0.11 1993-11

1. Problems

(a) No issues running

(b) Archived

2. Results

(a) Level 1

i. - Map

A. - Max = 14.09-m, Mean = 5.70-m, U10 = 29.32-m/s

ii. - Validation

A. - Highly energetic month with multiple storm peaks ¿ 4-m. The only trend is an under-estimation of many of those

storm peaks, however, 44008 has a very good agreement for all the peaks. The southern buoy locations still have a tendency to over-estimate peaks.

(b) Level 2
   i. - Map
      A. - Max = 7.25-m, Mean = 3.04-m, U10 = 23.60-m/s
   ii. - Validation
      A. - Similar to level 1

(c) Level 3N
   i. - Map
      A. - Max = 6.27-m, Mean = 2.29-m, U10 = 23.48-m/s
   ii. - Validation
      A. - 44005 - negative bias except peak on 29th (over-estimation)
      B. - 44007 - low on peaks
      C. - 44013 - low on peaks

(d) Level 3C
   i. - Map
      A. - Max = 6.59-m, Mean = 2.32-m, U10 = 20.92-m/s
   ii. - Validation
      A. - 44009 - positive bias including during events late in month
      B. - 44014 - good fit
      C. - 44056 - low early, issues with wave attenuation late in month

(e) Level 3S1
   i. - Map
      A. - Max = 6.35-m, Mean = 2.30-m, U10 = 20.17-m/s
   ii. - Validation
      A. - 41002 - low on early peak, high on later peaks
      B. - 41009 - decent fit
      C. - 41010 - decent fit

(f) Level 3S2

i. - Map
   A. - Max = 4.28-m, Mean = 2.18-m, U10 = 17.55-m/s
ii. - Validation
   A. - 41009 - decent fit, a little high during low waves

0.12 1993-12

1. Problems
   (a) No issues running
   (b) Archived
2. Results
   (a) Level 1
      i. - Map
         A. - Max = 14.04-m, Mean = 5.81-m, U10 = 31.91-m/s
      ii. - Validation
         A. - Very active month with at least 4 storms ¿ 4-m. Model under-estimates each storm event especially the northern buoy locations. The southern locations over-estimate the early peak but still under-estimate the later peaks.
   (b) Level 2
      i. - Map
         A. - Max = 10.57-m, Mean = 3.84-m, U10 = 29.53-m/s
      ii. - Validation
         A. - Similar to level 1
   (c) Level 3N
      i. - Map
         A. - Max = 8.02-m, Mean = 3.00-m, U10 = 24.22-m/s
      ii. - Validation
         A. - 44005 - negative bias
         B. - 44007 - low on 22nd peak by 1-m
         C. - 44013 - low on all peaks

(d) Level 3C

i. - Map

A. - Max = 6.24-m, Mean = 2.55-m, U10 = 24.23-m/s

ii. - Validation

A. - 44009 - high early in month but data cut out early

B. - 44014 - low on peaks, direction looks good

(e) Level 3S1

i. - Map

A. - Max = 5.03-m, Mean = 2.54-m, U10 = 19.76-m/s

ii. - Validation

A. - 41002 - low on peaks

B. - 41009 - pretty good fit, slight positive bias at times

C. - 41010 - positive bias early, low on peaks later in month

(f) Level 3S2

i. - Map

A. - Max = 4.47-m, Mean = 2.31-m, U10 = 15.38-m/s

ii. - Validation

A. - 41009 - good fit, slight positive bias

0.13 1993-stats

0.13.1 Level 1

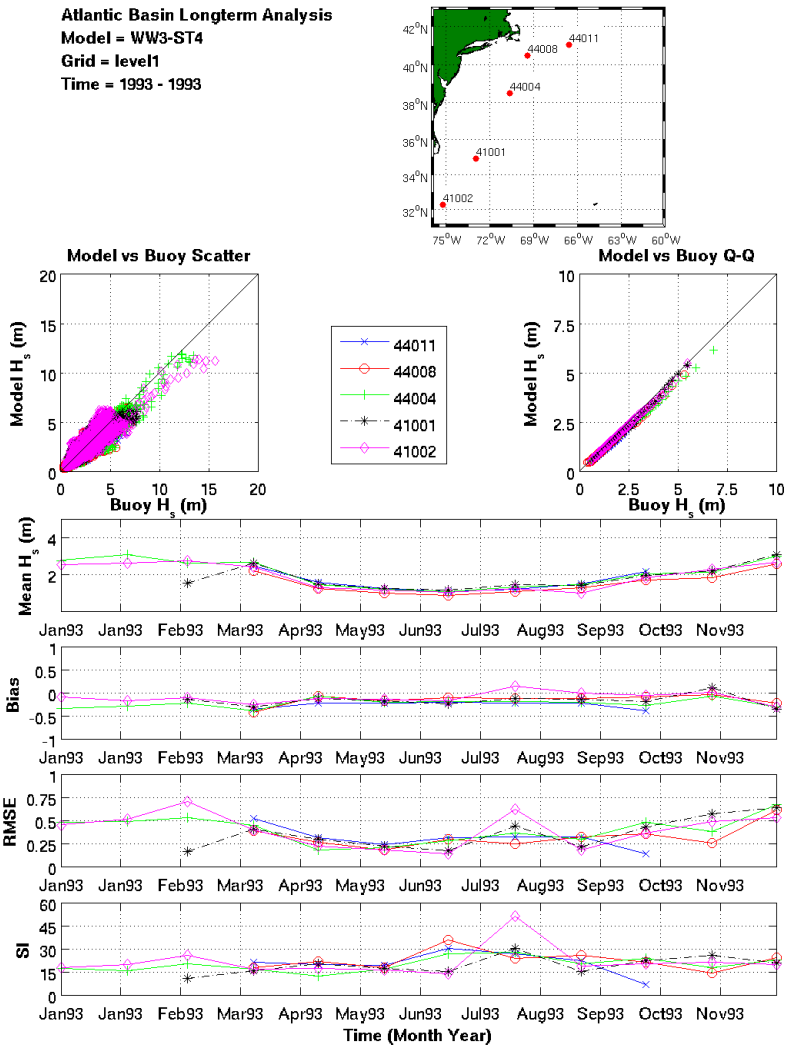

Figure 1: Comp 2 for Level 1

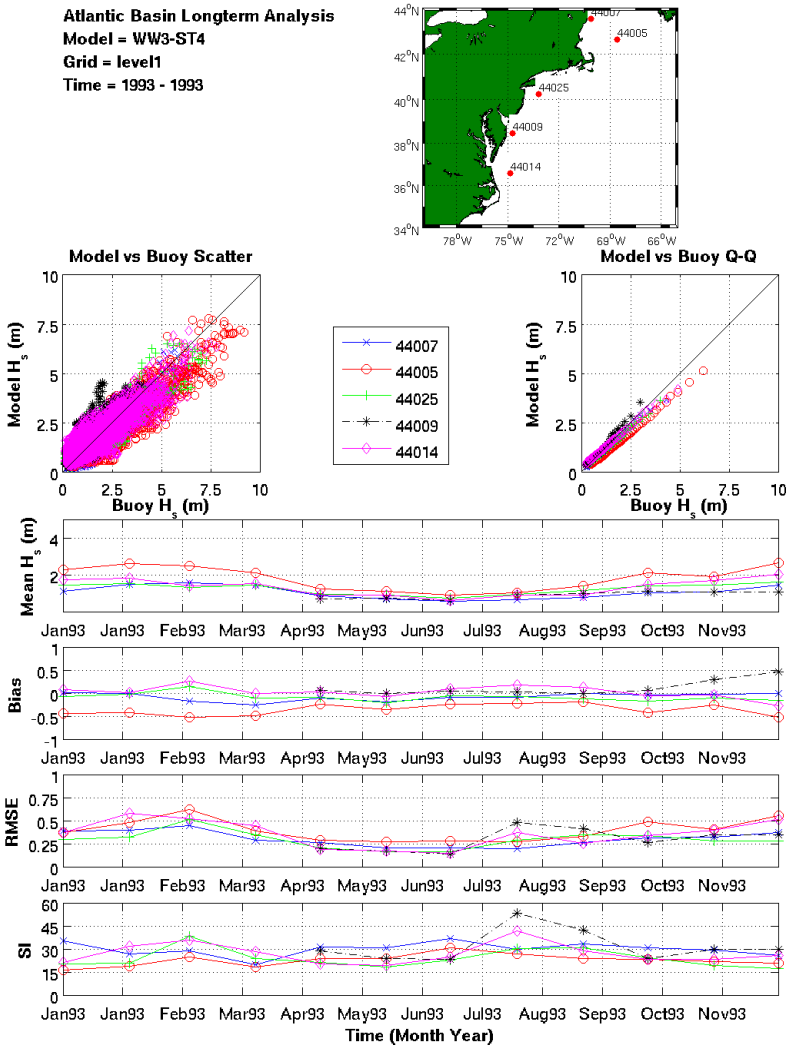

Figure 2: Comp 3 for Level 1

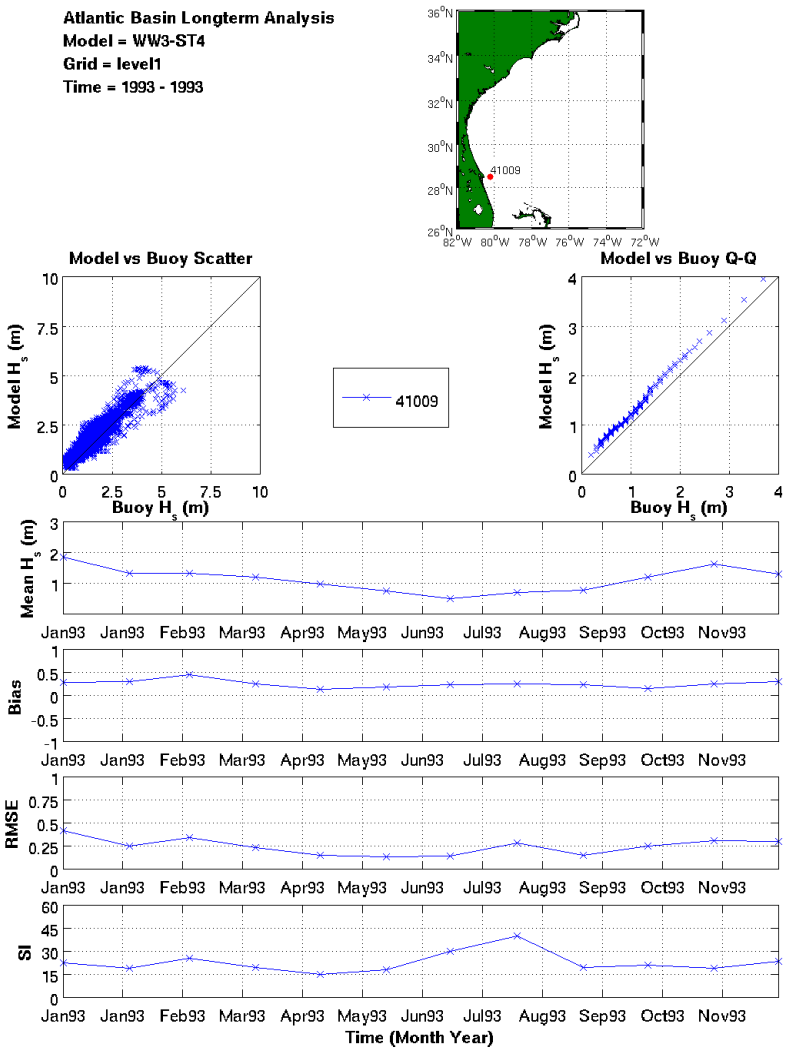

Figure 3: Comp 4 for Level 1

0.13.2 Level 2

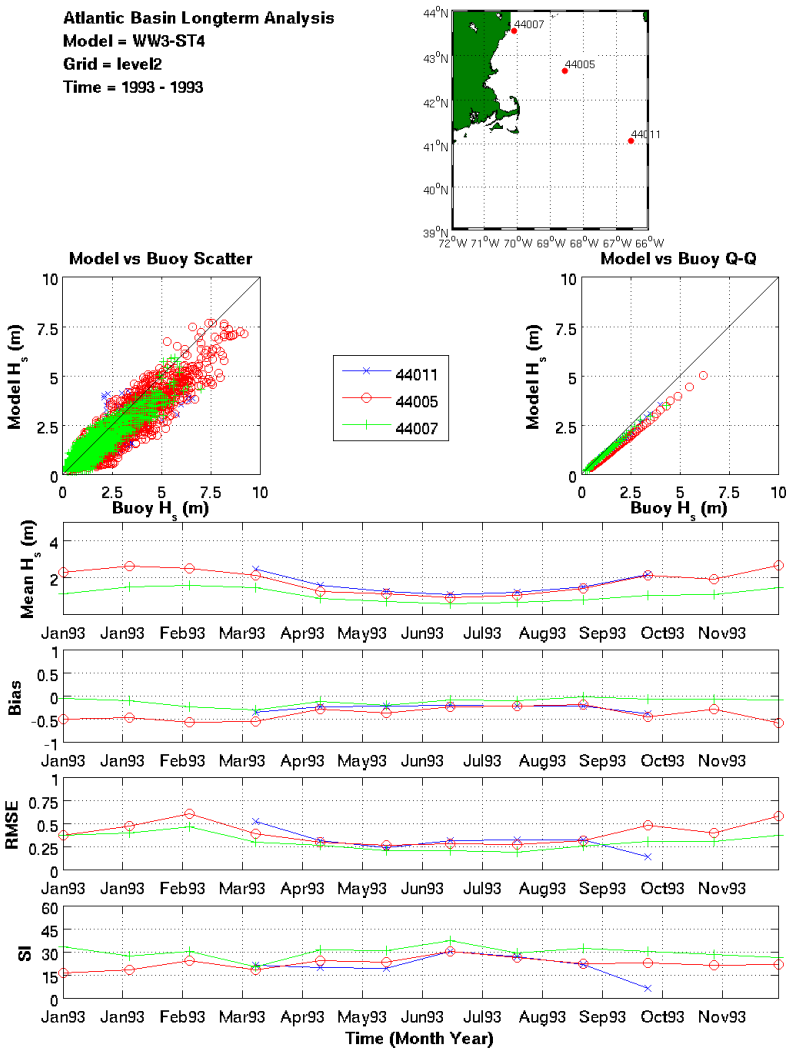

Figure 4: Comp 2 for Level 2

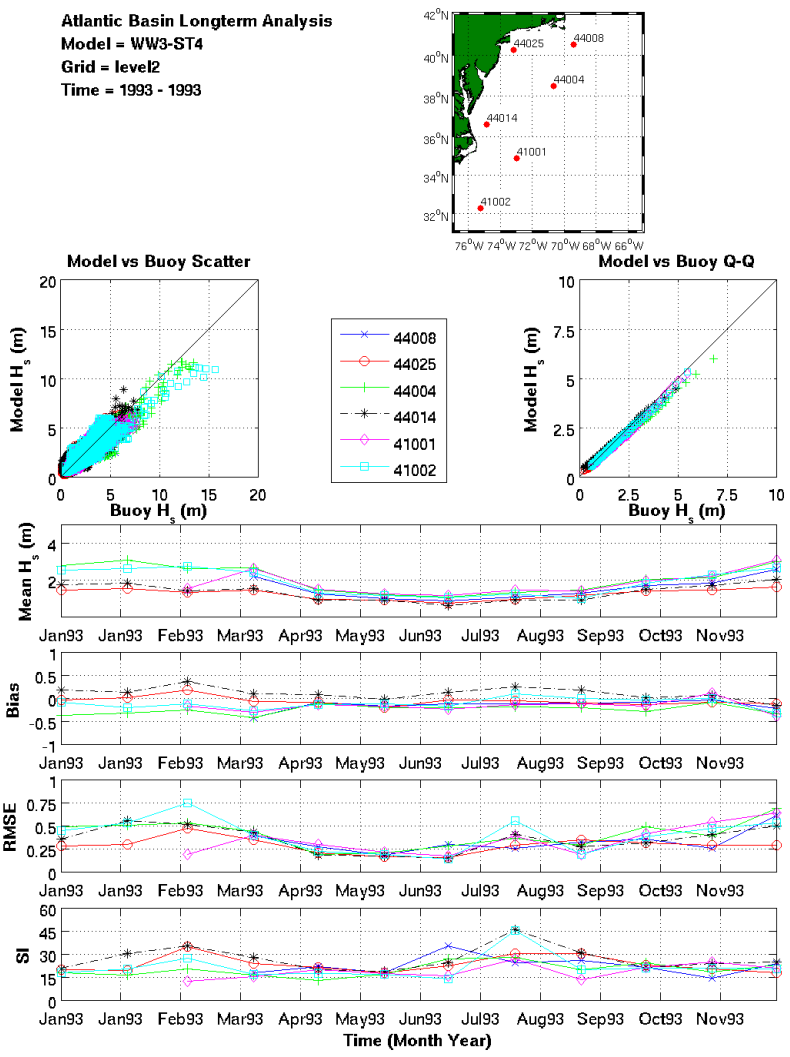

Figure 5: Comp 3 for Level 2

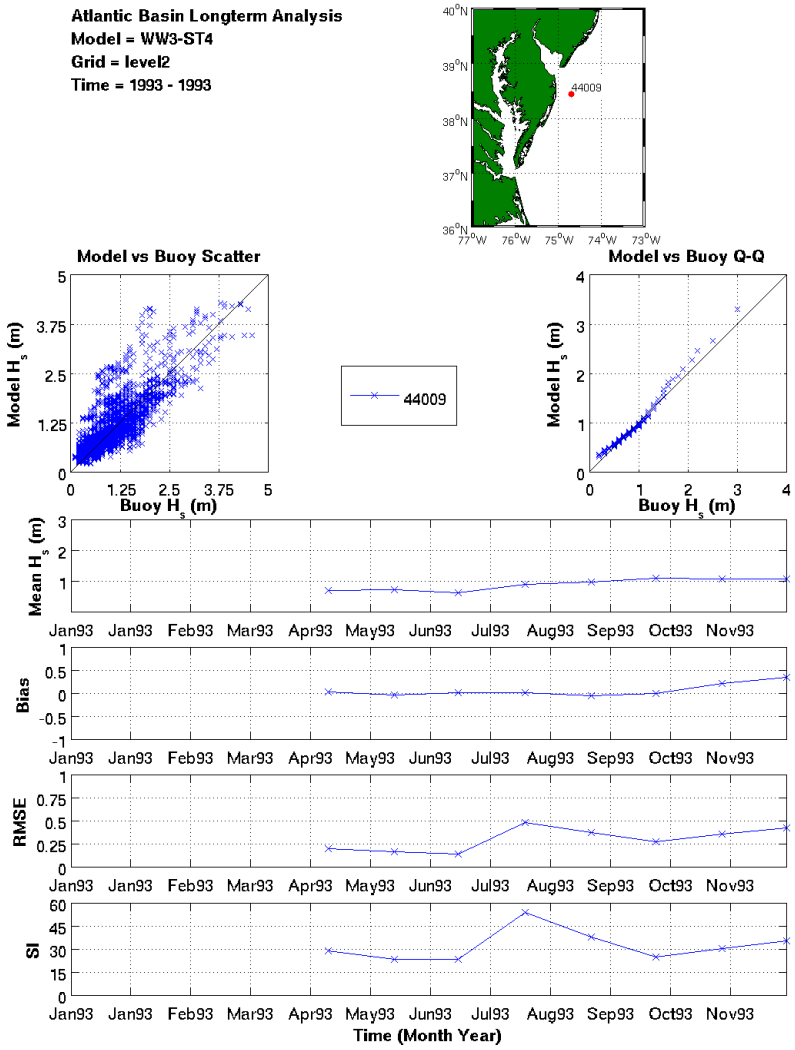

Figure 6: Comp 4 for Level 2

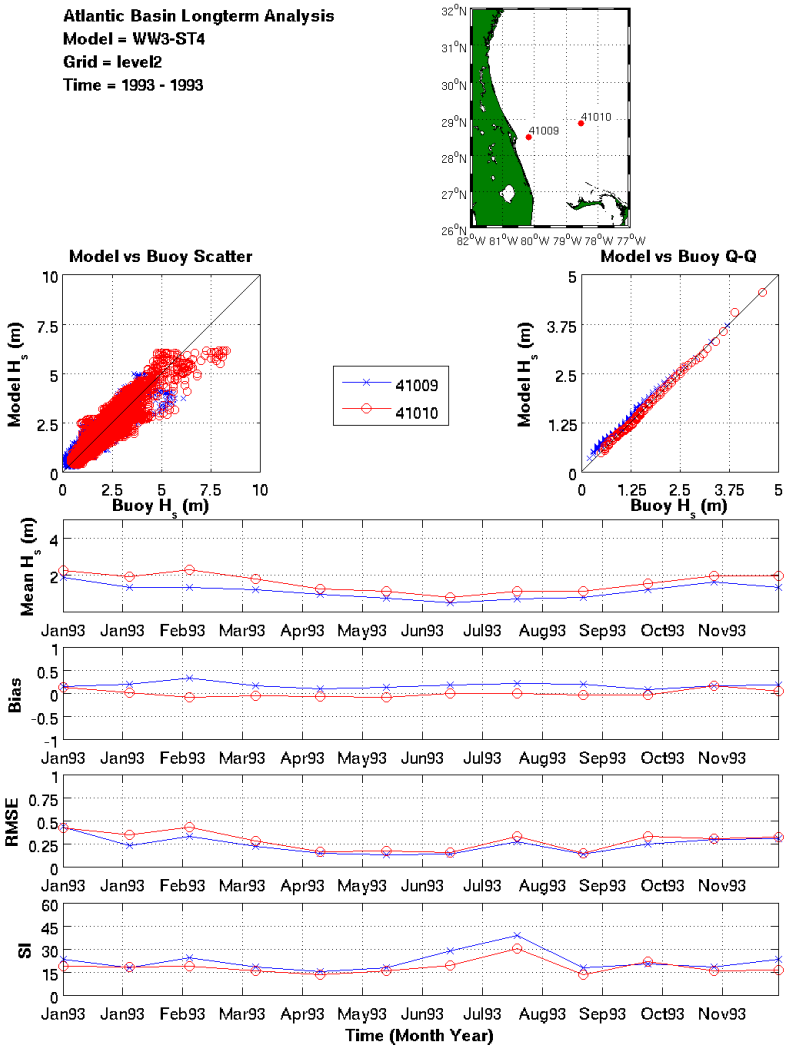

Figure 7: Comp 5 for Level 2

0.13.3 Level 3N

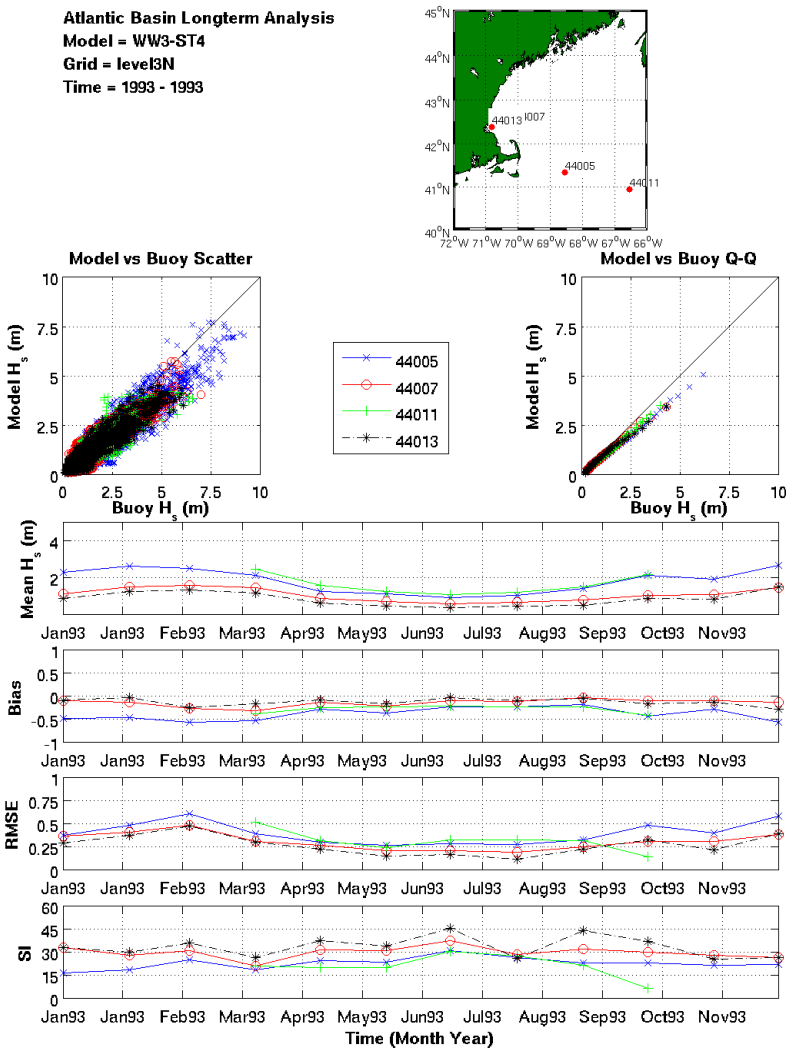

Figure 8: Comp 1 for Level 3N

0.13.4 Level 3C

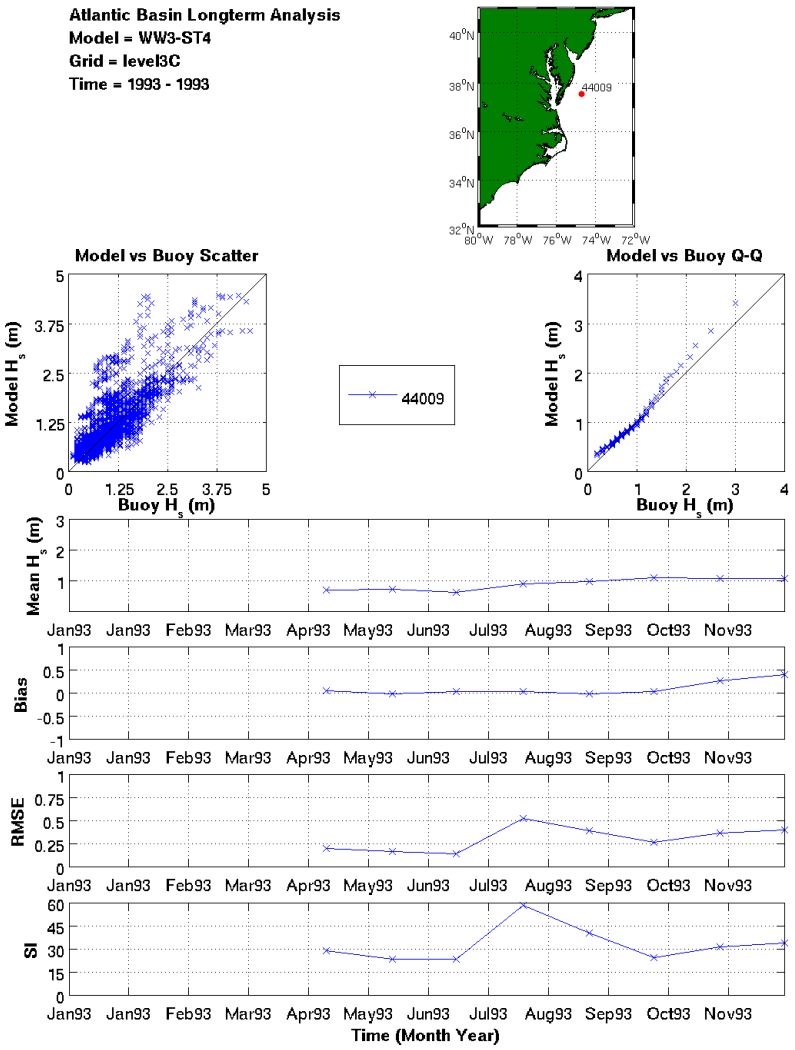

Figure 9: Comp 1 for Level 3C

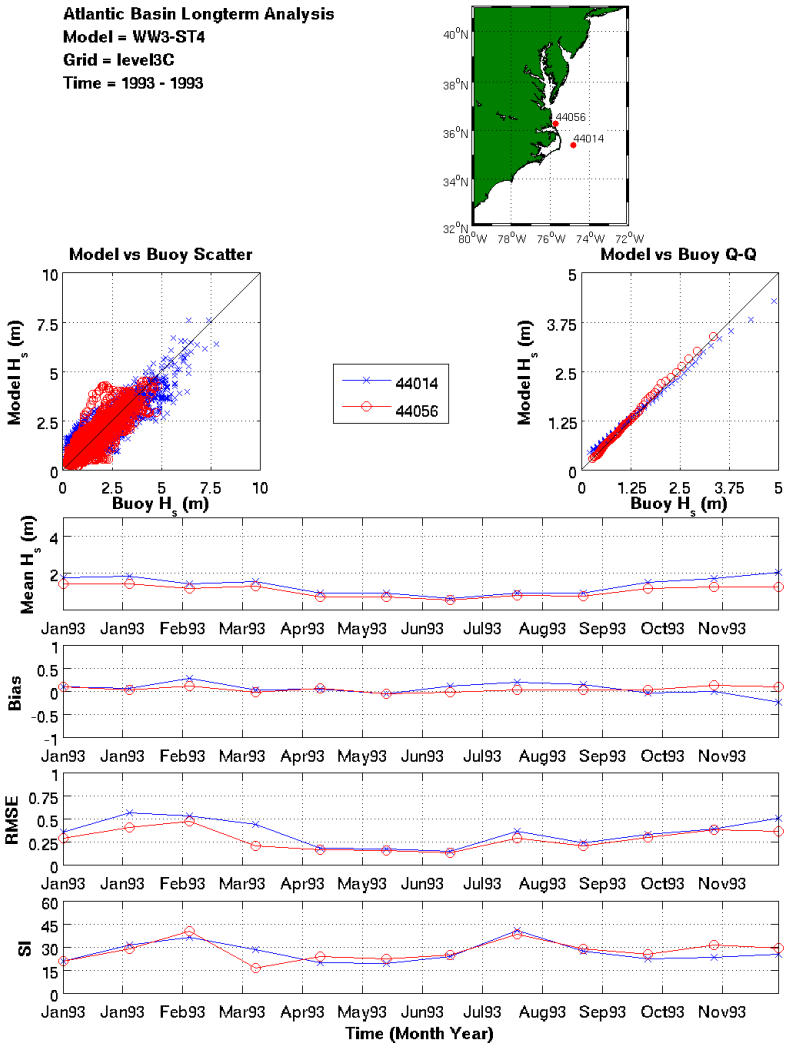

Figure 10: Comp 2 for Level 3C

0.13.5 Level 3S1

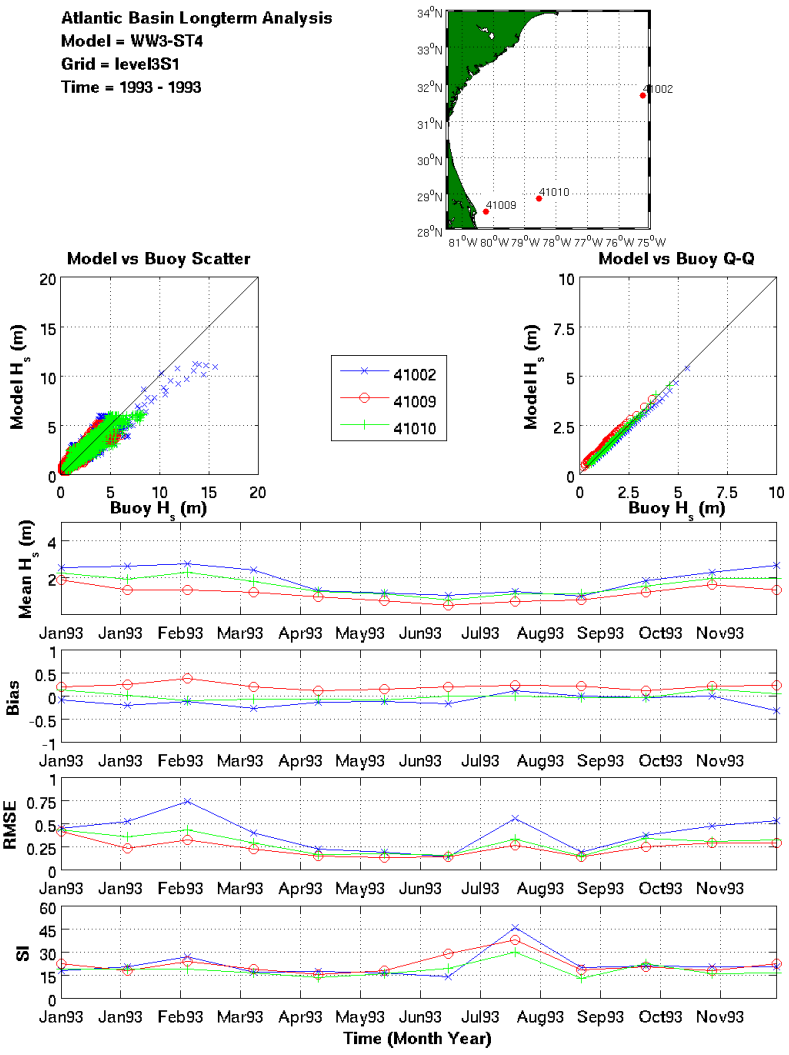

Figure 11: Comp 1 for Level 3S1

0.13.6 Level 3S2

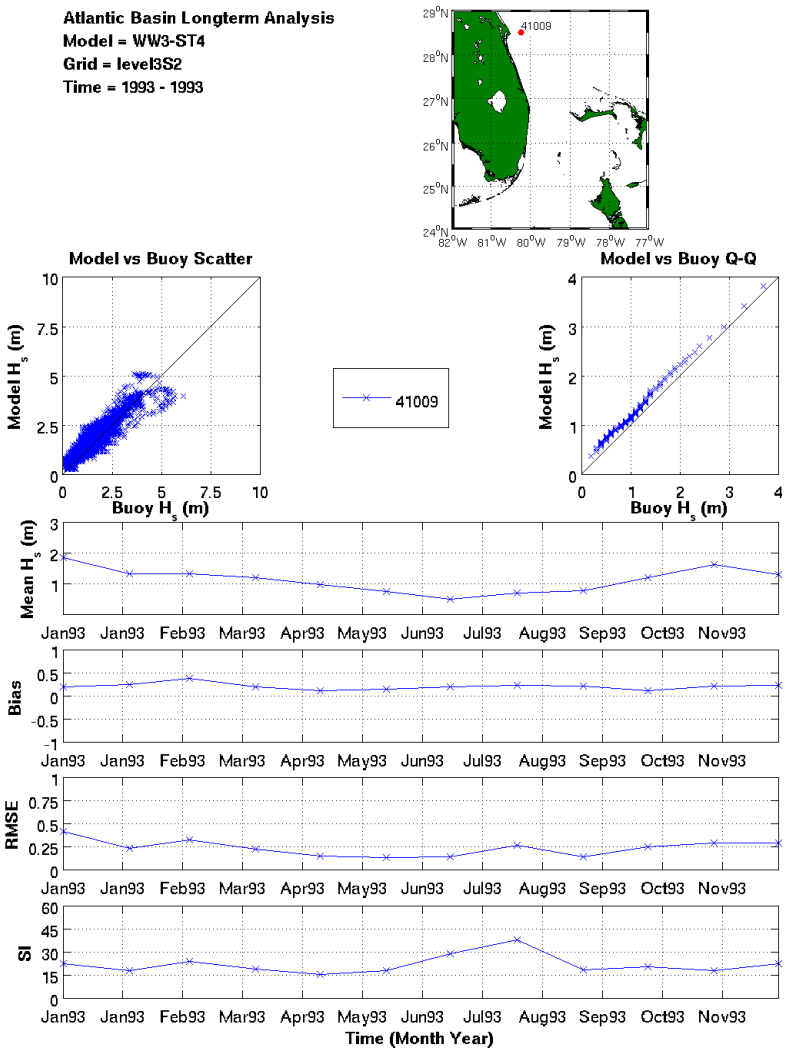

Figure 12: Comp 1 for Level 3S2