0.1 1989-01

1. Problems
   (a) No issues running
2. Results
   (a) Level 1
      i. - Map
         A. - Max = 21.16-m, Mean = 6.45-m, U10 = 33.96-m/s
         B. - new mask did not resolve issue of maximum wave heights in Northeast corner.
      ii. - Validation
         A. - Model results tend to under-estimate all peak wave heights. The mean period is low at most buoys for the entire month. Only at the Florida buoys does the wave height match or over-estimate peak wave heights.
   (b) Level 2
      i. - Map
         A. - Max = 11.13-m, Mean = 4.01-m, U10 = 33.96-m/s
      ii. - Validation
         A. - Similar to level 1
   (c) Level 3N
      i. - Map
         A. - Max = 7.15-m, Mean = 2.51-m, U10 = 26.20-m/s
      ii. - Validation
         A. - 44005 - Negatively bias in both wave height and mean period.
         B. - 44007 - Only under-estimated peak wave heights but mean period is negatively bias
         C. - 44011 - similar to 44005
         D. - similar to 44007.
   (d) Level 3C
      i. - Map

A. - Max = 6.37-m, Mean = 2.42-m, U10 = 24.76-m/s

ii. - Validation

A. - 44009 - good fit for wave height. Mean period low.

B. - 44012 - similar to 44009

C. - 44056 - good result for both wave height and mean period.

(e) Level 3S1

i. - Map

A. - Max = 6.37-m, Mean = 2.30-m, U10 = 23.85-m/s

ii. - Validation

A. - 41002 - Under-estimated wave height and mean period at peak on the 4th.

B. - 41008 - Positive bias in wave height for most of the month

C. - 41009 - similar to 41008 except a slight under-estimate of wave heights on the 22nd event.

D. - 41010 - good results overall.

(f) Level 3S2

i. - Map

A. - Max = 5.22-m, Mean = 2.36-m, U10 = 18.44-m/s

ii. - Validation

A. - similar to level 3S1

0.2 1989-02

1. Problems

   (a) No issues running

2. Results

   (a) Level 1

   i. - Map

   A. - Max = 12.83-m, Mean = 6.26-m, U10 = 30.02-m/s

   ii. - Validation

A. - wave height results are all over the place. At some buoys there was a very good fit. At others, there is the same under-estimation of peak wave heights and in Florida the model over-estimates the peak wave heights.

(b) Level 2

i. - Map

A. - Max = 7.49-m, Mean = 2.88-m, U10 =24.53-m/s

ii. - Validation

A. - Simlar to level 1

(c) Level 3N

i. - Map

A. - Max = 5.55-m, Mean = 2.23-m, U10 = 19.59-m/s

ii. - Validation

A. - 44005 - Negatively bias for both wave height and mean period

B. - 44007 - Good fit for wave height. Negative bias in mean period

C. - 44011 - Similar to 44005

D. - 44013 - Under-estimation of wave height and mean period during only peak on the 25th.

(d) Level 3C

i. - Map

A. - Max = 6.18-m, Mean = 2.23-m, U10 = 19.58-m/s

ii. - Validation

A. - 44009 - Good result for wave height. Mean period low

B. - 44012 - similar to 44009

C. - 44056 - Under-estimate peak on the 24th, mean period looks good.

(e) Level 3S1

i. - Map

A. - Max = 4.95-m, Mean = 2.14-m, U10 = 17.22-m/s

ii. - Validation

A. - 41002 - wave height low on peak evetn on the 24th.

B. - 41008 - Postive bias in wave height for the month including during the peak

C. - 41009 - similar to 41008

D. - 41010 - positive bias during lower wave conditions. Negative bias during only peak on the 24th. OFFSHORE WIND.

(f) Level 3S2

i. - Map

A. - Max = 5.81-m, Mean = 2.54-m, U10 = 15.65-m/s

ii. - Validation

A. - 41009 - positive bias in wave hieght throughout month.

0.3 1989-03

1. Problems

   (a) No issues running

2. Results

   (a) Level 1

   i. - Map

   A. - Max = 13.09-m, Mean = 5.09-m, U10 = 25.73-m/s

   ii. - Validation

   A. - An event occured on the 7th through the 12th which was measured at all the southern buoys. The model was close with this event, but still often under-estimated it. The northern buoys had no distinctive event but a lot of little peaks which were all under-estimated.

   (b) Level 2

   i. - Map

   A. - Max = 7.01-m, Mean = 2.93-m, U10 = 20.55-m/s

   ii. - Validation

   A. - Similar to level 1

(c) Level 3N

i. - Map

A. - Max = 5.85-m, Mean = 2.37-m, U10 = 17.74-m/s

ii. - Validation

A. - 44005 - Negative bias in wave height and mean period all month.

B. - 44007 - Lots of little peaks in wave height not captured in the model.

C. - 44011 - Better general trend than 44005 but still missed most peaks.

D. - 44013 - Under-estimated largest wave height event by 2-m.

(d) Level 3C

i. - Map

A. - Max = 6.93-m, Mean = 2.29-m, U10 = 19.43-m/s

ii. - Validation

A. - 44009 - Phase issues in wave height early in the month but good fit later.

B. - 44012 - Not enough data

C. - 44056 - Phase issues throughout the month.

(e) Level 3S1

i. - Map

A. - Max = 6.56-m, Mean = 2.04-m, U10 = 20.55-m/s

ii. - Validation

A. - 41002 - Under-estimation of largest peak wave heights on the 10th.

B. - 41008 - Over-estimation of largest wave heights on the 10th. Direction looks good.

C. - 41009 - Wave height values look good but phase issues at the largest event.

D. - 41010 - Under-estimates wave heigths and mean period during event on the 10th.

(f) Level 3S2

i. - Map
   A. - Max = 5.98-m, Mean = 1.89-m, U10 = 20.55-m/s
ii. - Validation
   A. - 41009 - similar to level 3S1

0.4 1989-04

1. Problems
   (a) No issues running
2. Results
   (a) Level 1
      i. - Map
         A. - Max = 11.10-m, Mean = 3.63-m, U10 = 26.09-m/s
      ii. - Validation
         A. - Overall a good month for the wave model. Some under-estimation of peaks in the northern buoys and some over-estimation at the southern buoys. Mean period still has some under-estimation problems.
   (b) Level 2
      i. - Map
         A. - Max = 6.89-m, Mean = 2.71-m, U10 = 22.16-m/s
      ii. - Validation
         A. - Similar to level 1
   (c) Level 3N
      i. - Map
         A. - Max = 6.08-m, Mean = 2.13-m, U10 = 18.53-m/s
      ii. - Validation
         A. - 44005 - Under-estimation of only really wave heigth peak in the month on the 17th.
         B. - 44007 - same as 44005
         C. - 44011 - good fit for wave heigth for the month.
         D. - 44013 - same as 44005 and 44007.

(d) Level 3C

i. - Map

A. - Max = 5.84-m, Mean = 2.12-m, U10 = 22.09-m/s

ii. - Validation

A. - 44009 - Some small over-estimation of wave heights at the peaks. Mean period looks good.

B. - 44056 - Simlar to 44009 but more over-estimation of wave heights.

(e) Level 3S1

i. - Map

A. - Max = 4.62-m, Mean = 1.86-m, U10 = 19.58-m/s

ii. - Validation

A. - 41008 - positive bias in wave height for the month.

B. - 41009 - same as 41008

C. - 41010 - same as 41008 and 41009

(f) Level 3S2

i. - Map

A. - Max = 3.24-m, Mean = 1.69-m, U10 = 11.94-m/s

ii. - Validation

A. - same as level 3S1

0.5 1989-05

1. Problems

(a) No issue running

2. Results

(a) Level 1

i. - Map

A. - Max = 8.61-m, Mean = 2.80-m, U10 = 22.94-m/s

ii. - Validation

A. - Low wave conditions for the month. The northern buoys all have a negative bias for wave height. The southern buoys have a positive bias, and the central buoys have a pretty good fit.

(b) Level 2

i. - Map

A. - Max = 4.99-m, Mean = 1.69-m, U10 = 20.03-m/s

ii. - Validation

A. - Similar to level 1

(c) Level 3N

i. - Map

A. - Max = 4.01-m, Mean = 1.47-m, U10 = 14.27-m/s

ii. - Validation

A. - 44005 - Negative bias in wave height and mean period.

B. - 44007 - under-estimated only peak during the month by 2-m.

C. - 44011 - Similar to 44005

D. - 44013 - Pretty good fit for wave height, mean period low.

(d) Level 3C

i. - Map

A. - Max = 4.32-m, Mean = 1.54-m, U10 = 17.51-m/s

ii. - Validation

A. - 44009 - Good fit for wave height, negative bias in mean period.

B. - 44056 - Positive bias in wave height.

(e) Level 3S1

i. - Map

A. - Max = 2.99-m, Mean = 1.47-m, U10 = 14.48-m/s

ii. - Validation

A. - 41008 - low wave heights, but decent fit.

B. - 41009 - positive bias for wave height

C. - 41010 - good fit for wave height.

(f) Level 3S2

i. - Map

A. - Max = 2.46-m, Mean = 1.35-m, U10 = 11.20-m/s

ii. - Validation

A. - 41009 - positive bias in wave height.

0.6 1989-06

1. Problems

(a) No issues running

2. Results

(a) Level 1

i. - Map

A. - Max = 5.14-m, Mean = 2.48-m, U10 = 19.96-m/s

ii. - Validation

A. - Low wave conditions for the month. A good fit for the model with offshore buoys, but the nearshore buoys had an under-estimation of peak wave heights. The Florida buoys had an over-estimation of wave heights.

(b) Level 2

i. - Map

A. - Max = 4.53-m, Mean = 1.61-m, U10 = 18.20-m/s

ii. - Validation

A. - Similar to level 1

(c) Level 3N

i. - Map

A. - Max = 2.75-m, Mean = 1.21-m, U10 = 14.42-m/s

ii. - Validation

A. - 44005 - under-estimate wave heights at peaks

B. - 44007 - Similar to 44005

C. - 44011 - Negative bias for both wave height and mean period

D. - 44013 - Similar to 44005.

(d) Level 3C

i. - Map

A. - Max = 2.96-m, Mean = 1.20-m, U10 = 13.84-m/s

ii. - Validation

A. - 44009 - Good fit overall, but low wave conditions.

B. - 44056 - No waves but good fit.

(e) Level 3S1

i. - Map

A. - Max = 2.26-m, Mean = 1.08-m, U10 = 12.31-m/s

ii. - Validation

A. - 41002 - Good fit for both wave height and mean period

B. - 41008 - Positive bias in wave heights, but low waves.

C. - 41009 - Same as 41008

D. - 41010 - Good fit overall

(f) Level 3S2

i. - Map

A. - Max = 2.24-m, Mean = 1.30-m, U10 = 11.07-m/s

ii. - Validation

A. - 41009 - Positive bias in wave height.

0.7 1989-07

1. Problems

   (a) No issue running

2. Results

   (a) Level 1

   i. - Map

   A. - Max = 6.15-m, Mean = 2.33-m, U10 = 21.57-m/s

B. - 2 storm tracks offshore

ii. - Validation

A. - Low wave conditions again. Some under-estimation of peaks in the northern buoys and offshore buoys, but all in all not a bad fit for the month.

(b) Level 2

i. - Map

A. - Max = 5.18-m, Mean = 2.04-m, U10 = 18.70-m/s

ii. - Validation

A. - Similar to level 1

(c) Level 3N

i. - Map

A. - Max = 2.81-m, Mean = 1.04-m, U10 = 14.32-m/s

ii. - Validation

A. - 44005 - Low waves, negative bias in wave height

B. - 44007 - good fit overall, still negative bias

C. - 44011 - low on peak wave height on the 18th

D. - 44013 - similar to 44011

(d) Level 3C

i. - Map

A. - Max = 2.54-m, Mean = 1.23-m, U10 = 13.10-m/s

ii. - Validation

A. - 44009 - good fit in wave height, mean period negatively bias

B. - 44056 - good fit

(e) Level 3S1

i. - Map

A. - Max = 2.47-m, Mean = 1.23-m, U10 = 13.10-m/s

ii. - Validation

A. - 41002 - Negative bias in wave height and mean period

B. - 41008 - low wave heights good fit

C. - 41009 - positive bias in wave height

D. - 41010 - good fit overall

(f) Level 3S2

i. - Map

A. - Max = 2.19-m, Mean = 1.40-m, U10 = 10.14-m/s

ii. - Validation

A. - 41009 - positive bias on wave heights.

0.8 1989-08

1. Problems

   (a) No issues running

2. Results

   (a) Level 1

   i. - Map

   A. - Max = 11.27-m, Mean = 2.95-m, U10 = 28.85-m/s

   B. - 5 storm tracks but all offshore.

   ii. - Validation

   A. - Rather calm wave conditions at buoys given the storms offshore. Two peaks are present at the northern buoys, the 8th and the 31st. The wave height peak on the 8th tends to be over-estimated by the model, and the peak on the 31st is under-estimated. The southern buoys have a smaller peak in the 21st that is matched well.

   (b) Level 2

   i. - Map

   A. - Max = 12.29-m, Mean = 1.91-m, U10 = 35.69-m/s

   B. - 2 tracks, both offshore

   ii. - Validation

   A. - Similar to level 1

   (c) Level 3N

   i. - Map

   A. - Max = 4.48-m, Mean = 1.38-m, U10 = 13.00-m/s

ii. - Validation

A. - 44005 - Over-estimation of only peak on the 8th by 2-m.

B. - 44007 - similar to 44005

C. - 44011 - Good fit in wave height, negative bias in mean period.

D. - 44013 - low waves but good fit.

(d) Level 3C

i. - Map

A. - Max = 2.71-m, Mean = 1.17-m, U10 = 12.88-m/s

ii. - Validation

A. - 44009 - some slight phase issues in wave height, but ok fit.

B. - 44056 - low waves but good fit.

(e) Level 3S1

i. - Map

A. - Max = 3.96-m, Mean = 1.28-m, U10 = 13.40-m/s

ii. - Validation

A. - 41002 - good fit, low waves.

B. - 41008 - some over-estimation of wave heights, and phase issue on peak.

C. - 41009 - similar to 41008

D. - 41010 - good fit

(f) Level 3S2

i. - Map

A. - Max = 4.51-m, Mean = 1.47-m, U10 = 15.60-m/s

ii. - Validation

A. - 41009 - similar to level 3S1

0.9 1989-09

1. Problems

(a) No issues running

2. Results

(a) Level 1

i. - Map

A. - Max = 18.79-m, Mean = 3.57-m, U10 = 40.32-m/s

B. - 4 storm tracks, one making landfall on US coastline

ii. - Validation

A. - 2 peaks during the month, one on the 9th and the other on the 22nd. The storm on the 9th is longer in duration but the model matched it pretty well. The storm on the 22nd has a steeper peak and the model tends to over-estimate wave heights during it.

(b) Level 2

i. - Map

A. - Max = 19.65-m, Mean = 2.58-m, U10 = 48.42-m/s

B. - 2 storm tracks with one making landfall in South Carolina.

ii. - Validation

A. - Similar to level 1

(c) Level 3N

i. - Map

A. - Max = 6.16-m, Mean = 1.99-m, U10 = 15.99-m/s

ii. - Validation

A. - 44005 - Phase issues during first peak on the 9th, and under-estimation of later peaks

B. - 44008 - Phase issues on the 9th, good fit otherwise.

C. - 44011 - good fit

D. - 44013 - similar to 44008.

(d) Level 3C

i. - Map

A. - Max = 18.89-m, Mean = 2.24-m, U10 = 42.30-m/s

B. - one storm making landfall in South Carolina.

ii. - Validation

A. - 44009 - Over-estimation of both peaks.

B. - 44058 - similar to 44009

(e) Level 3S1

i. - Map

A. - Max = 18.37-m, Mean = 2.31-m, U10 = 42.61-m/s

B. - one track through grid

ii. - Validation

A. - 41002 - Good fit.

B. - 41008 - Over-estimation of peak on the 22nd by ¿ 2-m.

C. - 41009 - Over-estimation of peak on the 22nd by 1-m.

D. - 41010 - similar to 41009.

(f) Level 3S2

i. - Map

A. - Max = 17.77-m, Mean = 2.31-m, U10 = 41.73-m/s

B. - one track through grid.

ii. - Validation

A. - 41009 - under-estimation of peak on the 22nd by 1-m.

0.10 1989-10

1. Problems

(a) No issues running

2. Results

(a) Level 1

i. - Map

A. - Max = 13.18-m, Mean = 4.28-m, U10 = 28.77-m/s

B. - One track in middle of ocean.

ii. - Validation

A. - One peak late in the month for southern buoys, and a lot of under-estimation at the northern buoys. Mean periods are negatively bias throughout.

(b) Level 2
    i. - Map
        A. - Max = 7.07-m, Mean = 2.47-m, U10 = 21.62-m/s
    ii. - Validation
        A. - similar to level 1

(c) Level 3N
    i. - Map
        A. - Max = 4.44-m, Mean = 1.70-m, U10 = 17.46-m/s
    ii. - Validation
        A. - 44005 - negative bias in wave height and mean period
        B. - 44007 - similar to 44005
        C. - 44011 - similar to 44005
        D. - 44013 - similar to 44005

(d) Level 3C
    i. - Map
        A. - Max = 5.62-m, Mean = 2.05-m, U10 = 16.19-m/s
    ii. - Validation
        A. - 44009 - under-estimation of wave height at only peak in month. mean period low.
        B. - 44056 - good fit

(e) Level 3S1
    i. - Map
        A. - Max = 5.58-m, Mean = 2.05-m, U10 = 16.80-m/s
    ii. - Validation
        A. - 41002 - good fit
        B. - 41008 - good fit
        C. - 41009 - good fit mean period negatively bias
        D. - 41010 - similar to 41009

(f) Level 3S2
    i. - Map
        A. - Max = 4.93-m, Mean = 1.78-m, U10 = 16.80-m/s
    ii. - Validation
        A. - 41009 - good fit, mean period negatively bias.

0.11 1989-11

1. Problems
   (a) No issues running
2. Results
   (a) Level 1
      i. - Map
         A. - Max = 12.61-m, Mean = 4.33-m, U10 = 28.74-m/s
      ii. - Validation
         A. - Under-estimation of most wave height peaks for the northern buoys. The southern buoys don't have a lot going on. Still seeing a the negative bias in mean period.
   (b) Level 2
      i. - Map
         A. - Max = 10.37-m, Mean = 3.13-m, U10 = 28.83-m/s
      ii. - Validation
         A. - Similar to level 1
   (c) Level 3N
      i. - Map
         A. - Max = 9.15-m, Mean = 2.66-m, U10 = 28.83-m/s
      ii. - Validation
         A. - 44005 - buoy went out before larger wave heights
         B. - 44007 - under-estimation of only peaks during the month.
         C. - 44011 - good fit
         D. - 44013 - low wave heights, some under-estimation
   (d) Level 3C
      i. - Map
         A. - Max = 4.73-m, Mean = 1.93-m, U10 = 21.58-m/s
      ii. - Validation
         A. - 44009 - good fit
         B. - 44056 - good fit

(e) Level 3S1

i. - Map

A. - Max = 3.92-m, Mean = 1.80-m, U10 = 16.43-m/s

ii. - Validation

A. - 41002 - under-estimation of wave height peaks later in month

B. - 41008 - not enough data

C. - 41009 - good fit

D. - 41010 - wave heights are off later in month

(f) Level 3S2

i. - Map

A. - Max = 2.95-m, Mean = 1.74-m, U10 = 12.35-m/s

ii. - Validation

A. - 41009 - good fit

0.12 1989-12

1. Problems

(a) No issues running

2. Results

(a) Level 1

i. - Map

A. - Max = 21.49-m, Mean = 5.77-m, U10 = 32.08-m/s

B. - Maximum wave height in Northeast corner of grid

ii. - Validation

A. - Some good size peak wave heights during the month. The northern buoys tend to be under-estimated at the peaks, and the central and southern buoys tend to be closer to matching.

(b) Level 2

i. - Map

A. - Max = 8.63-m, Mean = 4.37-m, U10 = 26.29-m/s

ii. - Validation
    A. - Similar to level 1

(c) Level 3N
    i. - Map
        A. - Max = 5.52-m, Mean = 2.82-m, U10 = 21.85-m/s
    ii. - Validation
        A. - 44007 - under-estimation of peak on the 3rd by 2-m.
        B. - 44011 - under-estimation of all peaks during the month
        C. - 44013 - similar to 44007

(d) Level 3C
    i. - Map
        A. - Max = 8.54-m, Mean = 2.67-m, U10 = 24.54-m/s
    ii. - Validation
        A. - 44009 - good fit
        B. - 44056 - slight under-estimation of peak on the 25th

(e) Level 3S1
    i. - Map
        A. - Max = 7.59-m, Mean = 2.59-m, U10 = 21.40-m/s
    ii. - Validation
        A. - 41002 - not enough data
        B. - 41008 - phase issues all month
        C. - 41009 - under-estimation of peak on the 25th
        D. - 41010 - under-estimation of all peak wave heights

(f) Level 3S2
    i. - Map
        A. - Max = 5.39-m, Mean = 2.23-m, U10 = 17.46-m/s
    ii. - Validation
        A. - 41009 - similar to level 3S1

0.13 1989-stats

0.13.1 Level 1

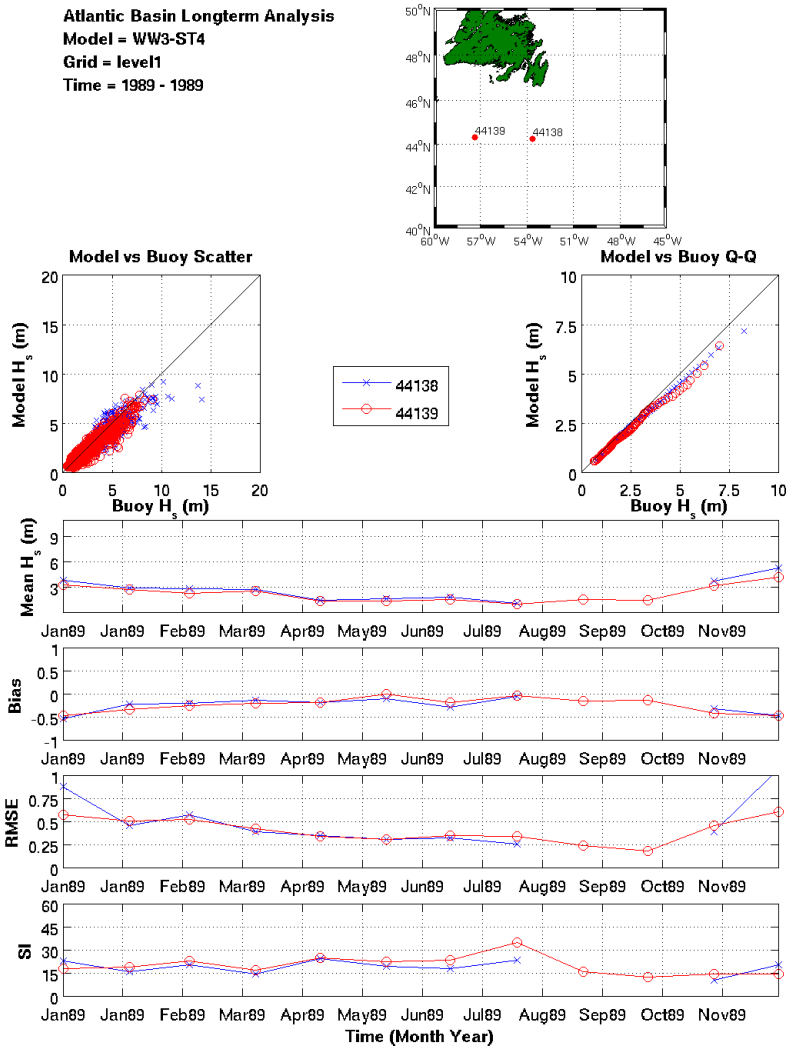

Figure 1: Comp 1 for Level 1

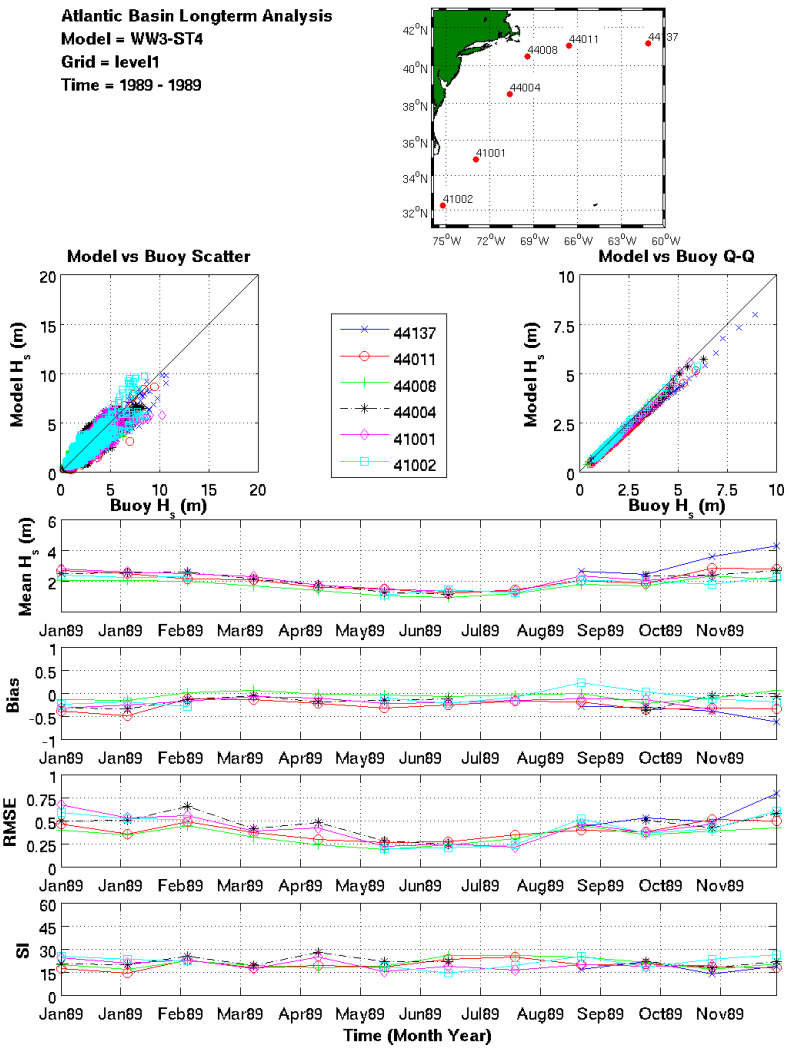

Figure 2: Comp 2 for Level 1

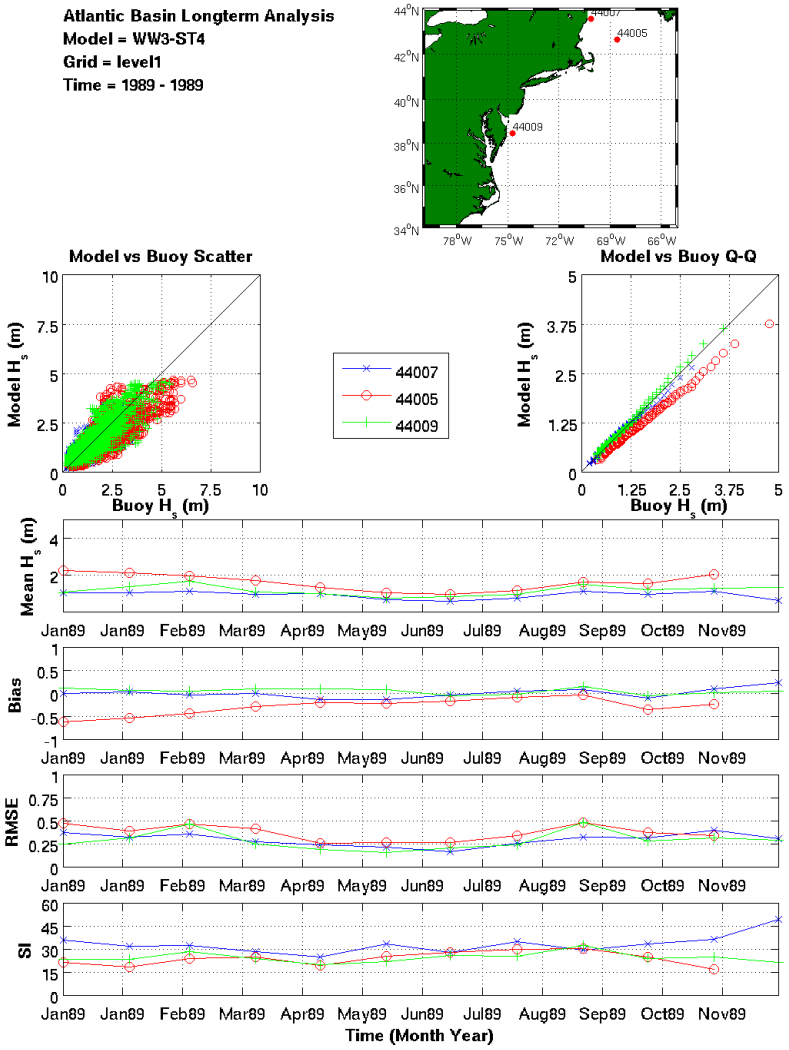

Figure 3: Comp 3 for Level 1

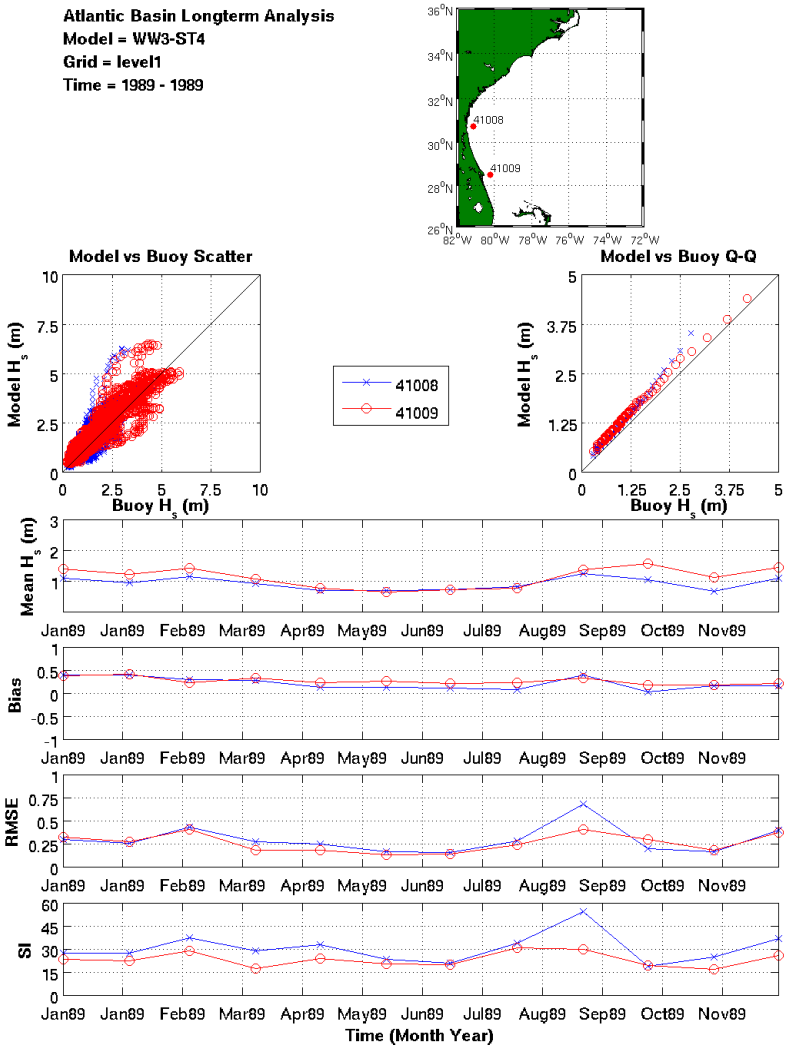

Figure 4: Comp 4 for Level 1

0.13.2 Level 2

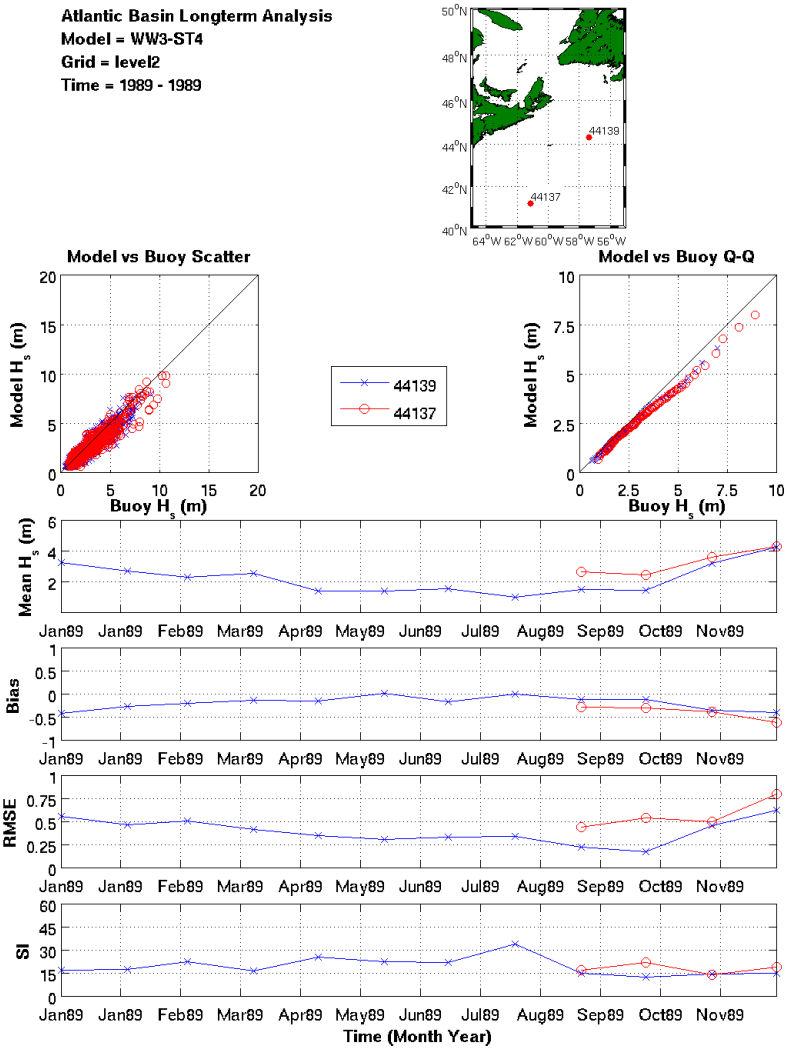

Figure 5: Comp 1 for Level 2

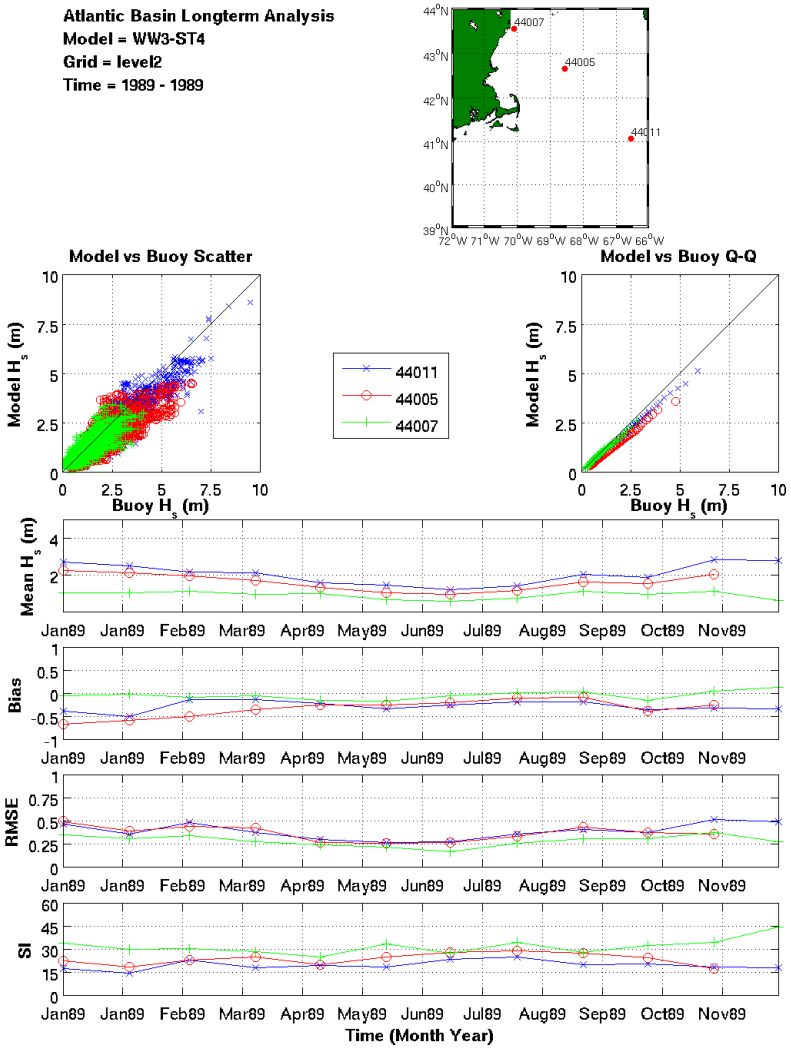

Figure 6: Comp 2 for Level 2

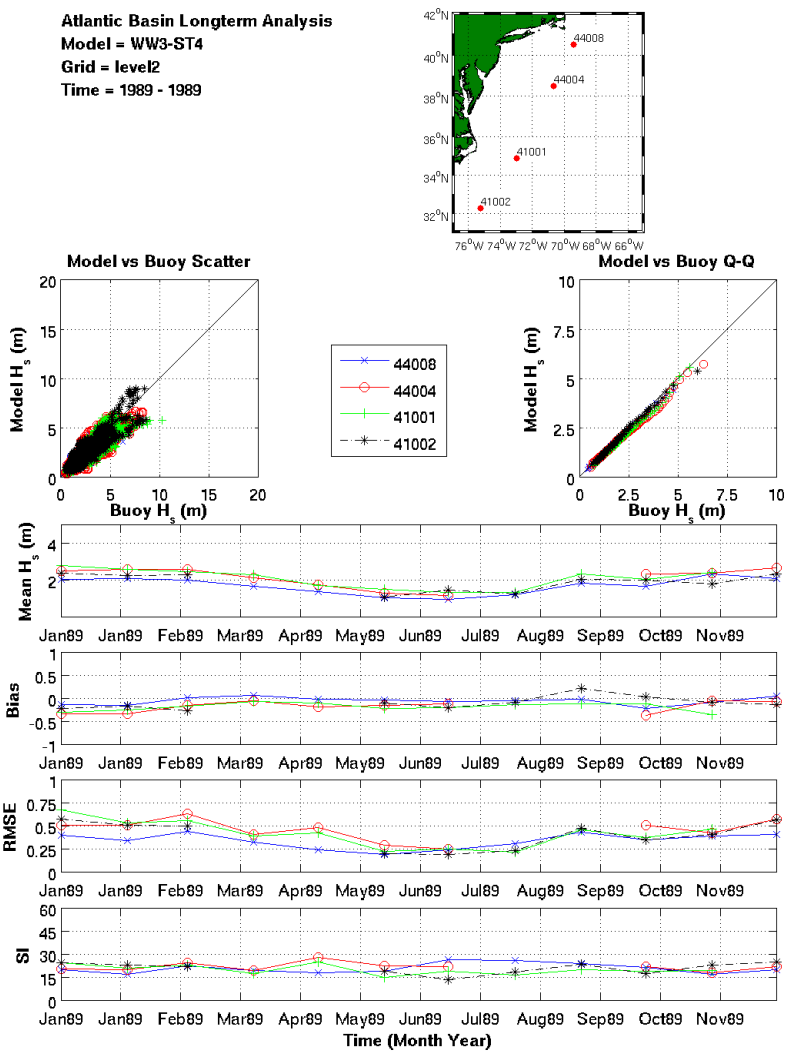

Figure 7: Comp 3 for Level 2

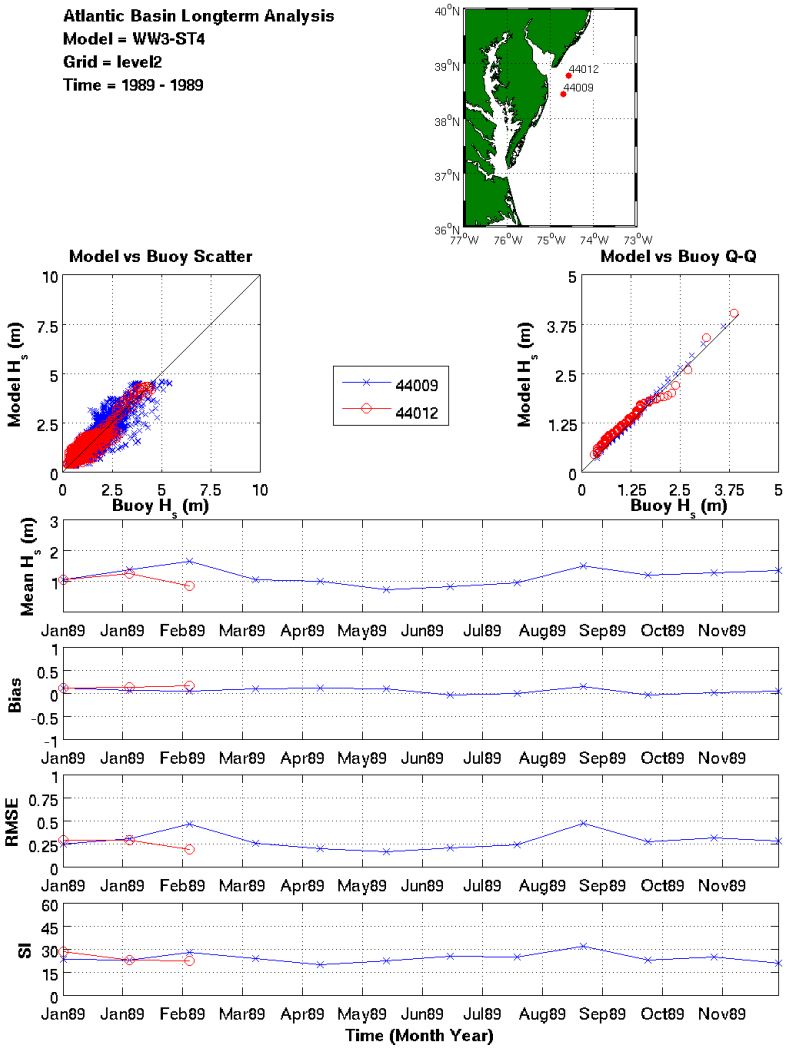

Figure 8: Comp 4 for Level 2

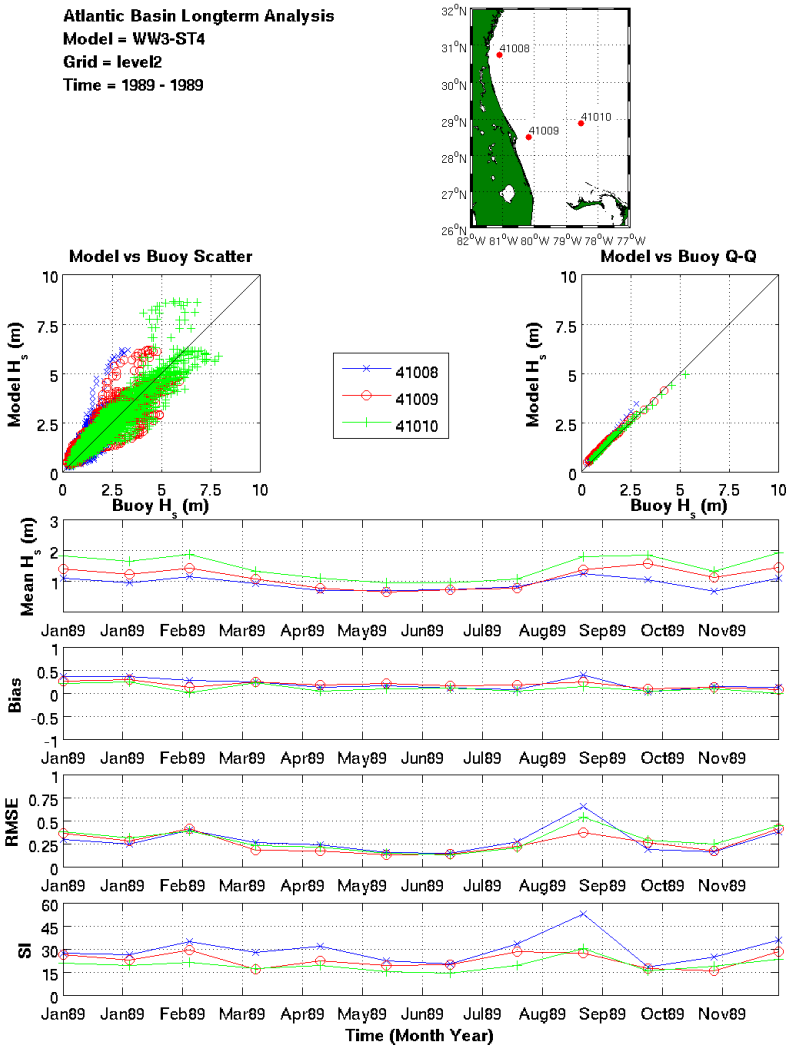

Figure 9: Comp 5 for Level 2

0.13.3 Level 3N

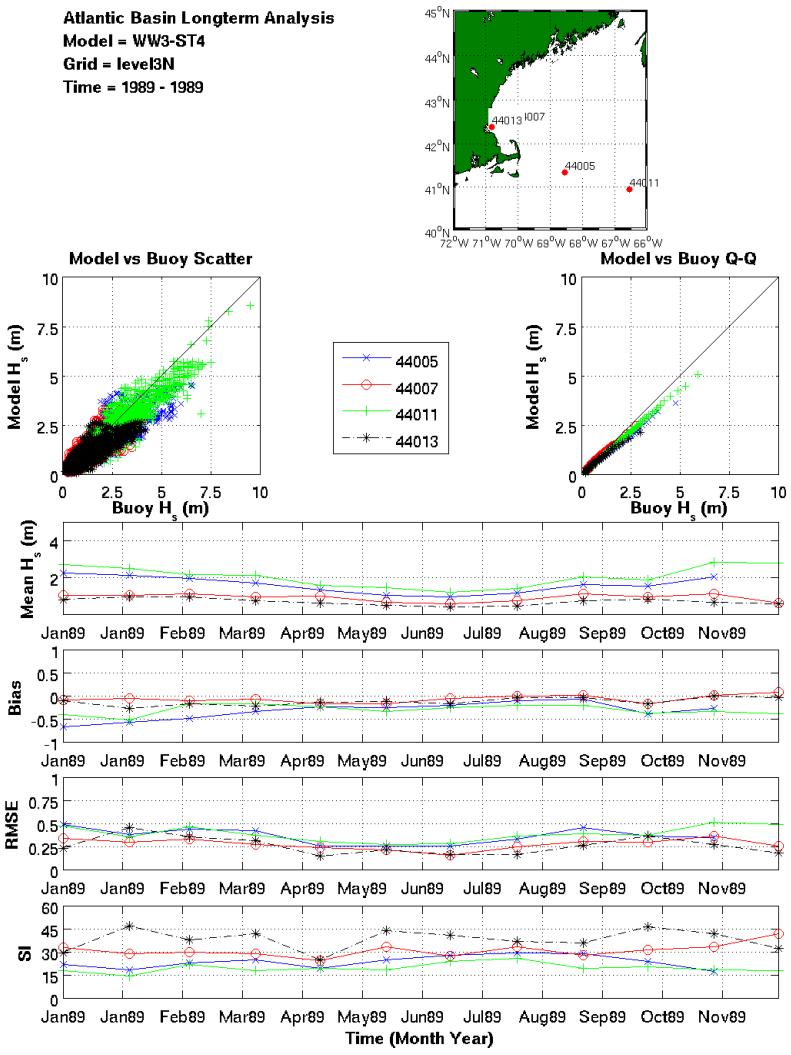

Figure 10: Comp 1 for Level 3N

0.13.4 Level 3C

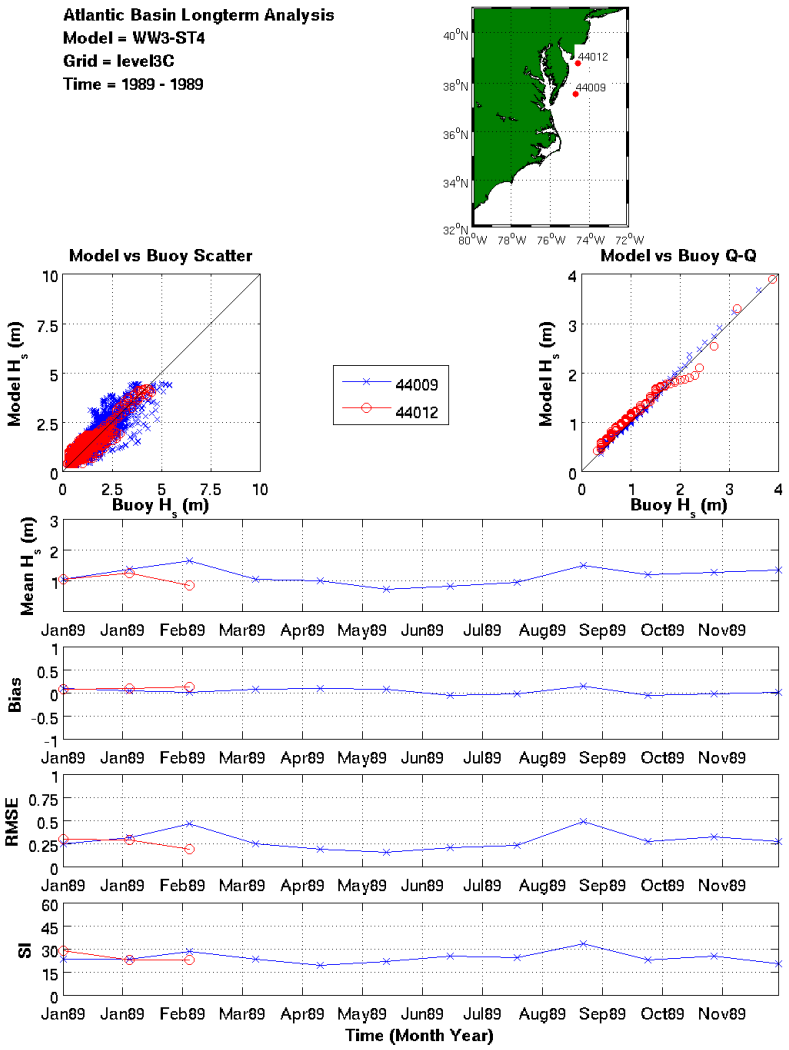

Figure 11: Comp 1 for Level 3C

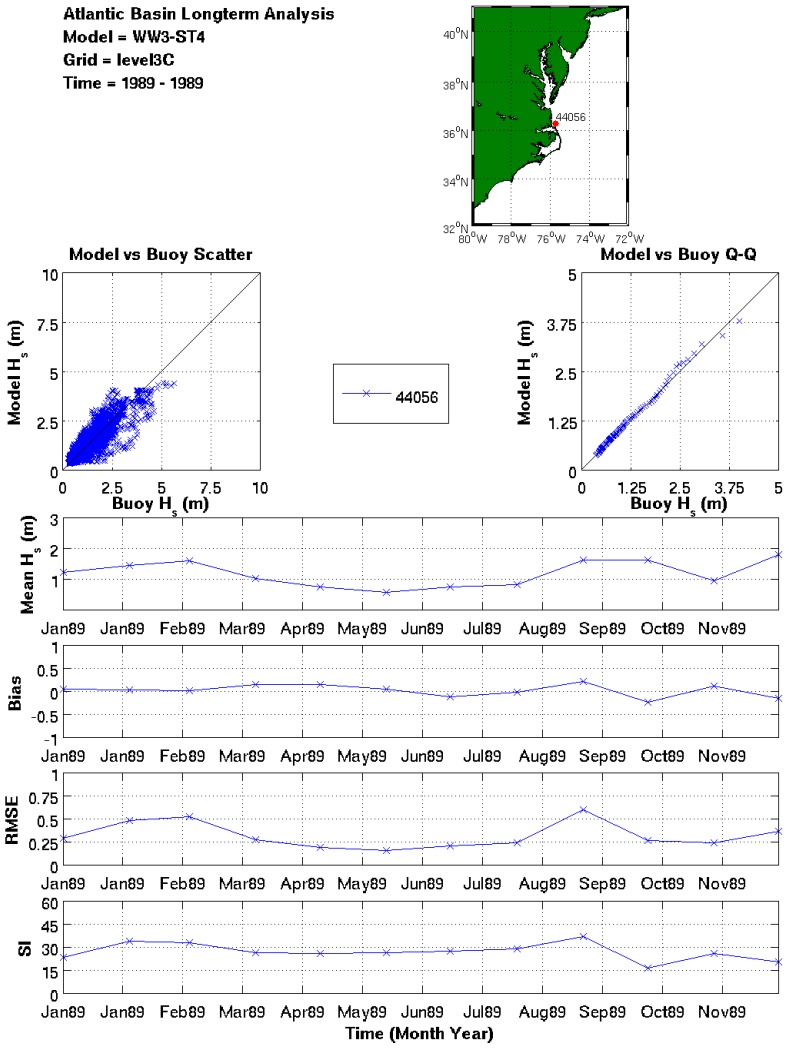

Figure 12: Comp 2 for Level 3C

0.13.5 Level 3S1

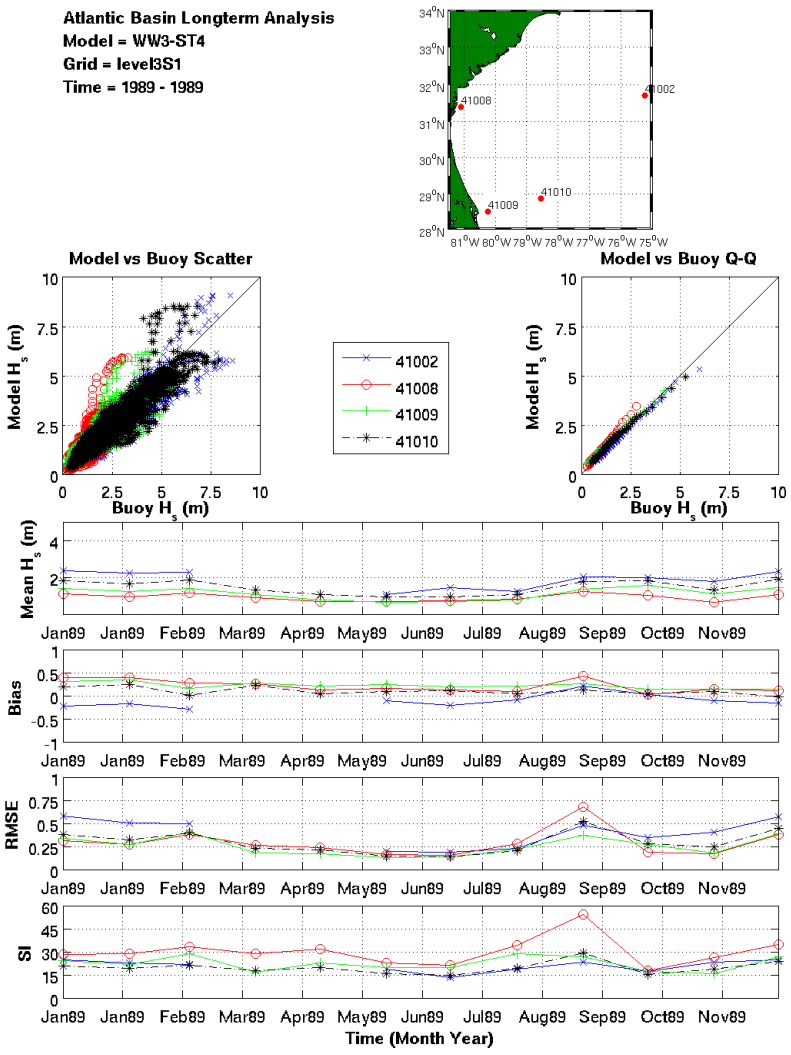

Figure 13: Comp 1 for Level 3S1

0.13.6 Level 3S2

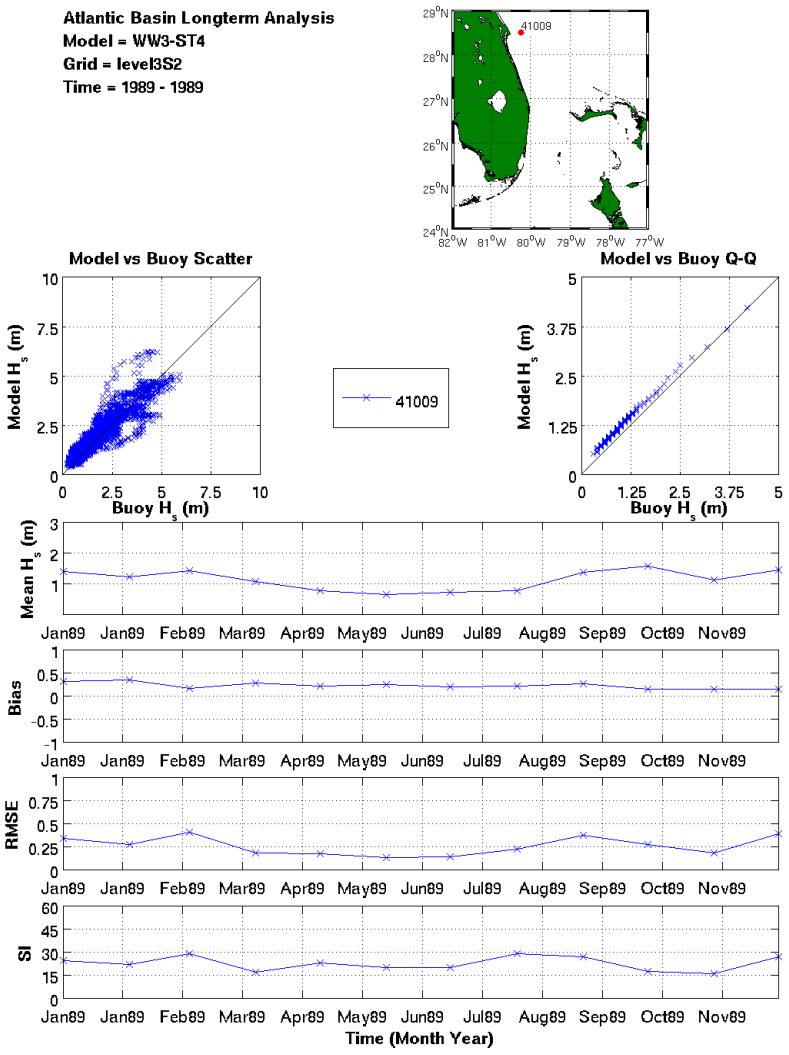

Figure 14: Comp 1 for Level 3S2