Dynamic Habitat Mapping of Pelagic Tuna and Shark Species for Improved Fisheries Management

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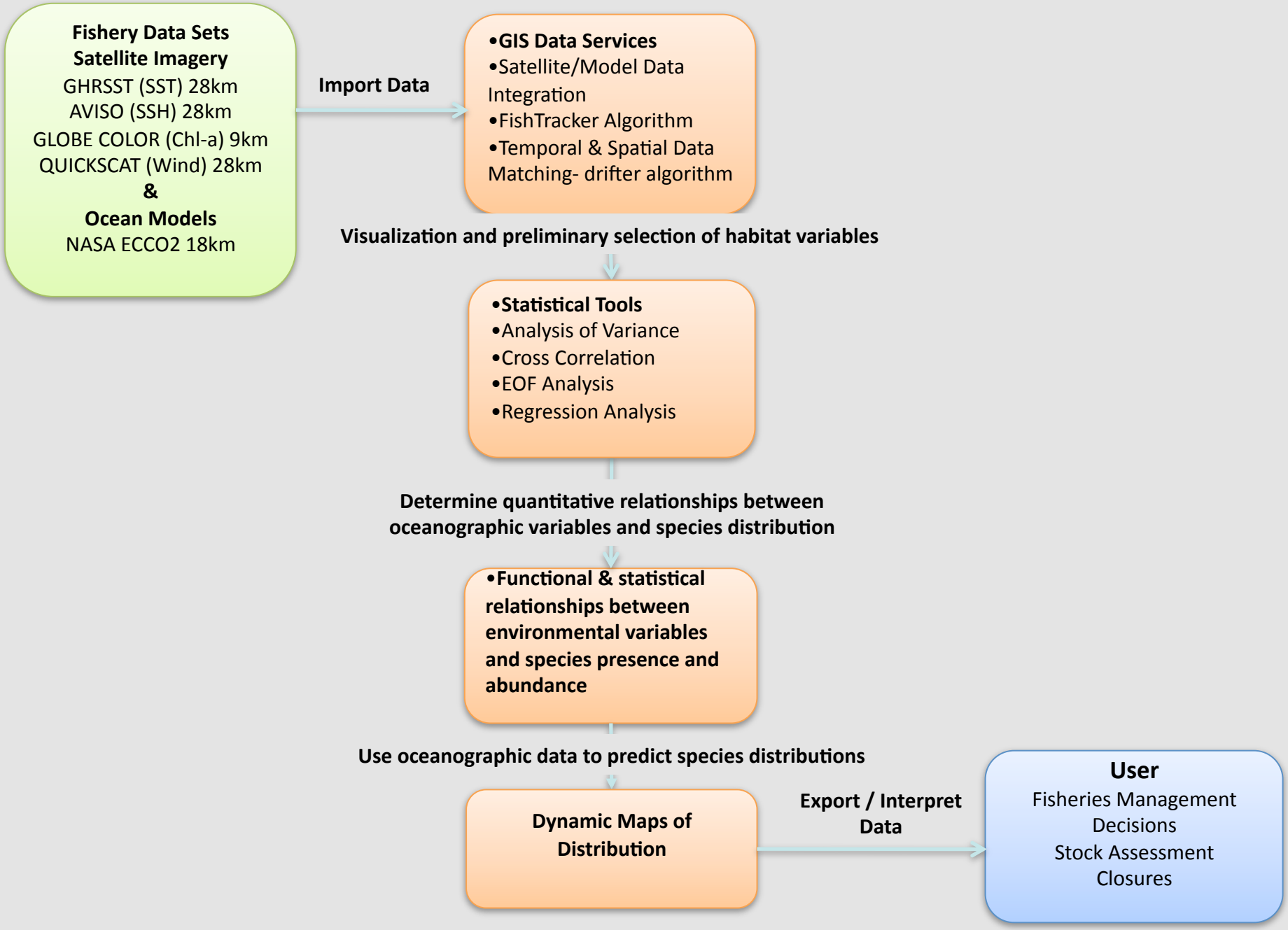
JPL (E. Armstrong)

Decision Support

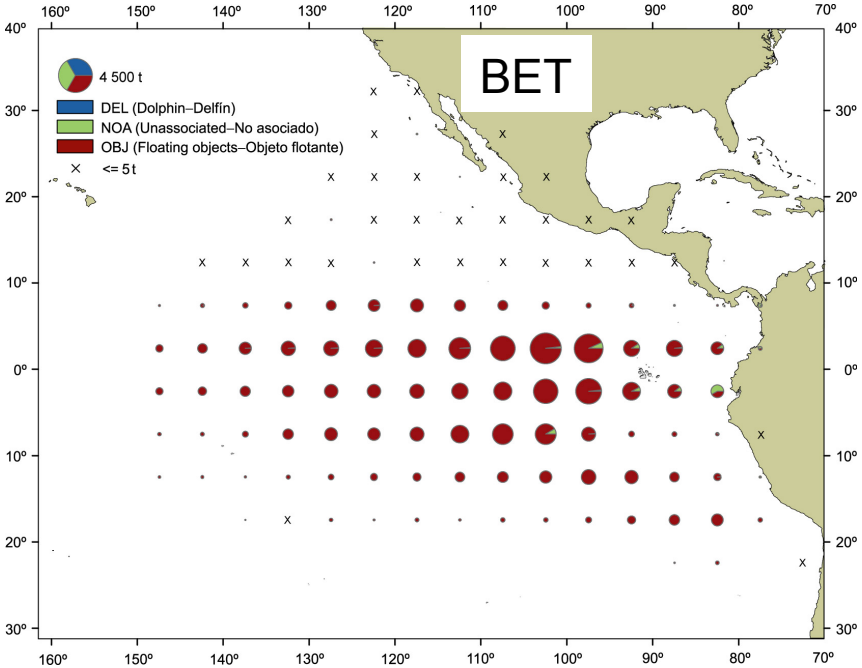
- Improve and automate IATTC's determination of Eastern Pacific Ocean tuna habitat and recruitment as inputs to it stock assessment model.

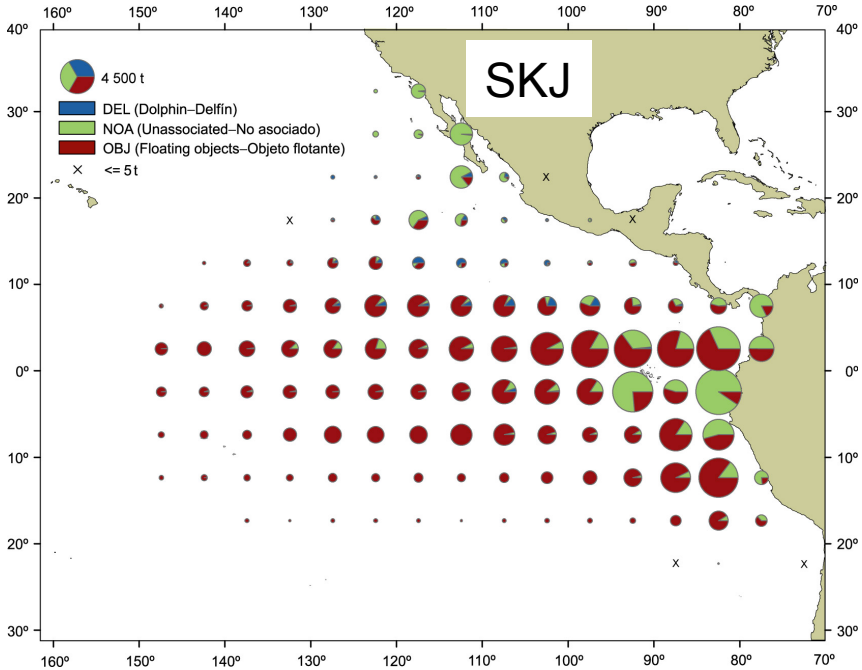
- Improve and automate SWFSC Pelagics Group's determination of California Current albacore and blue, thresher, and mako shark habitat for stock assessment and conservation.

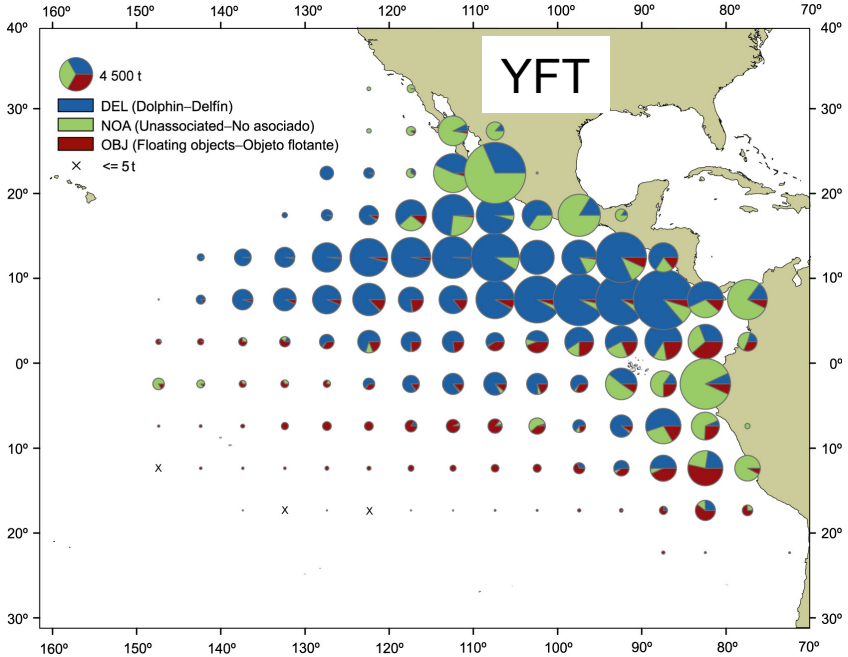
PHAM Habitat Analysis Process Flow

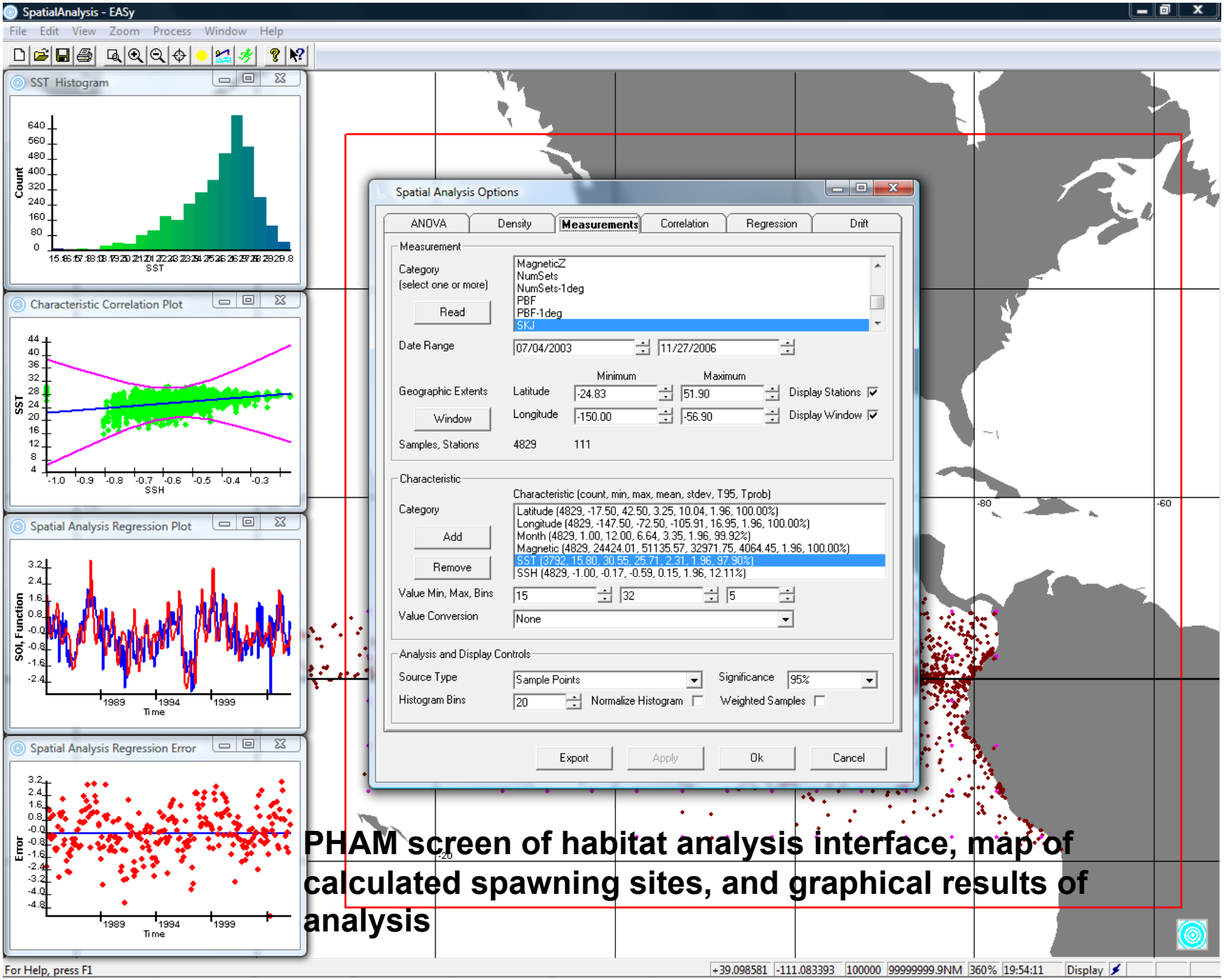


Distribution of purse seine catches

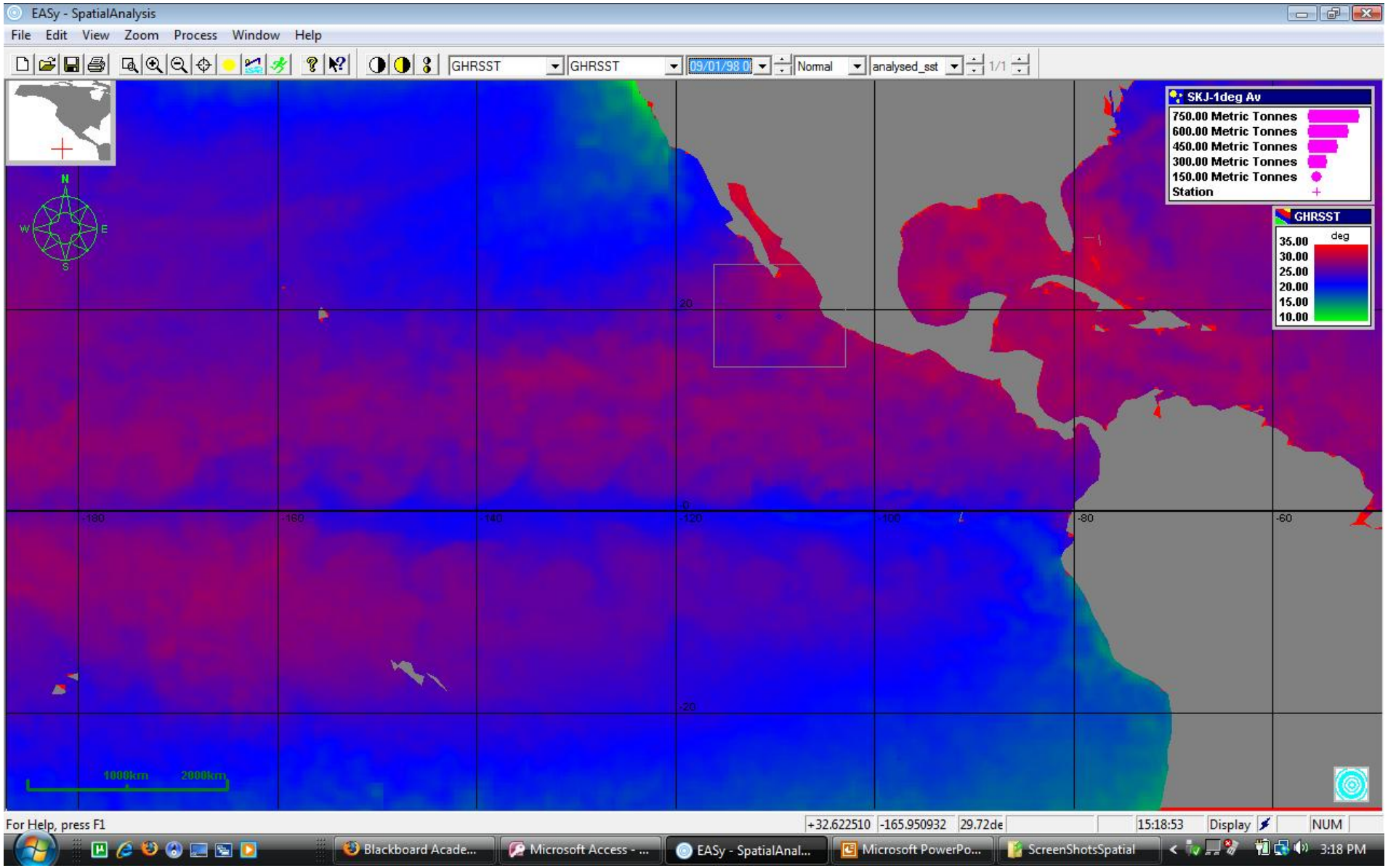




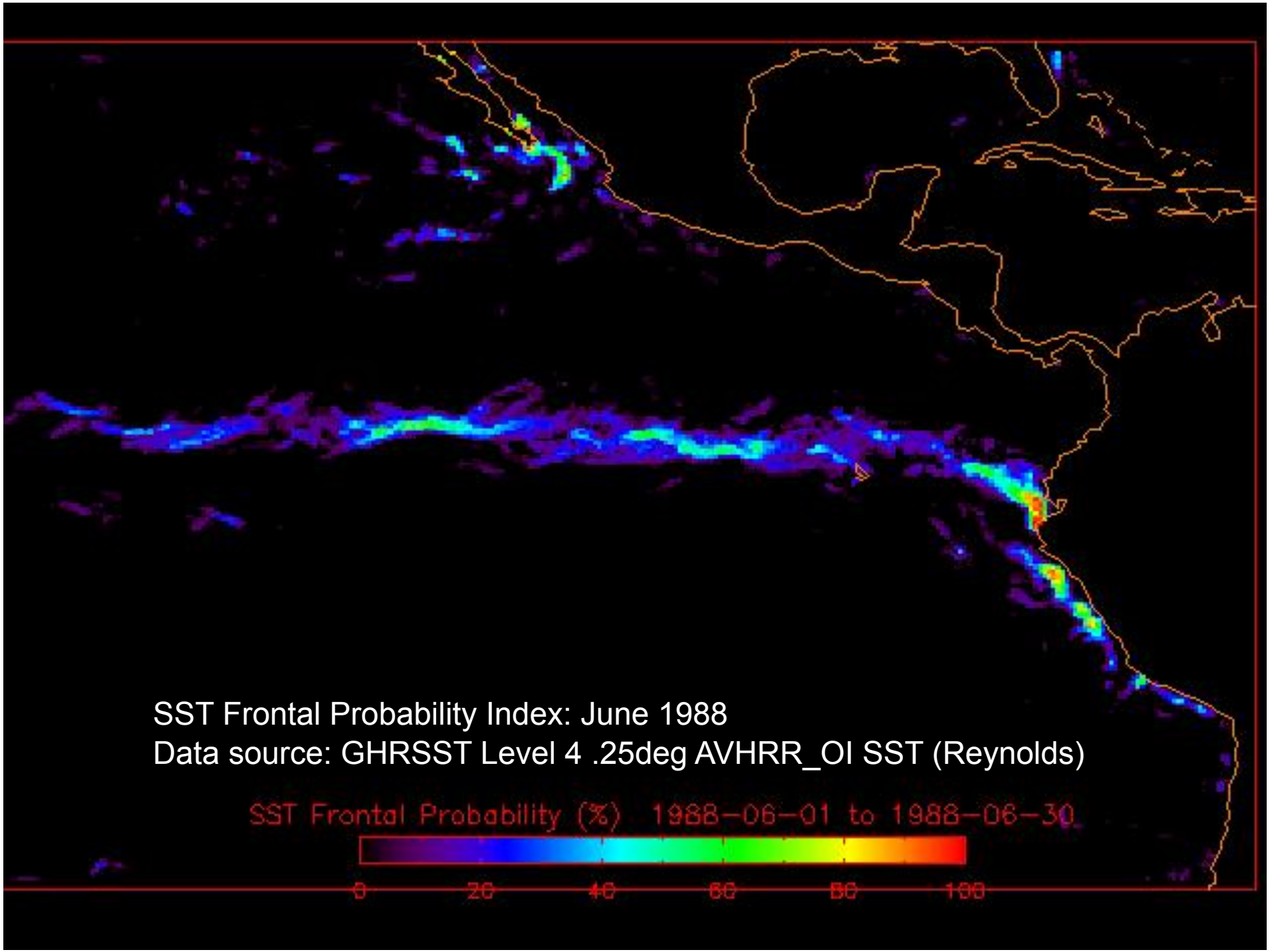


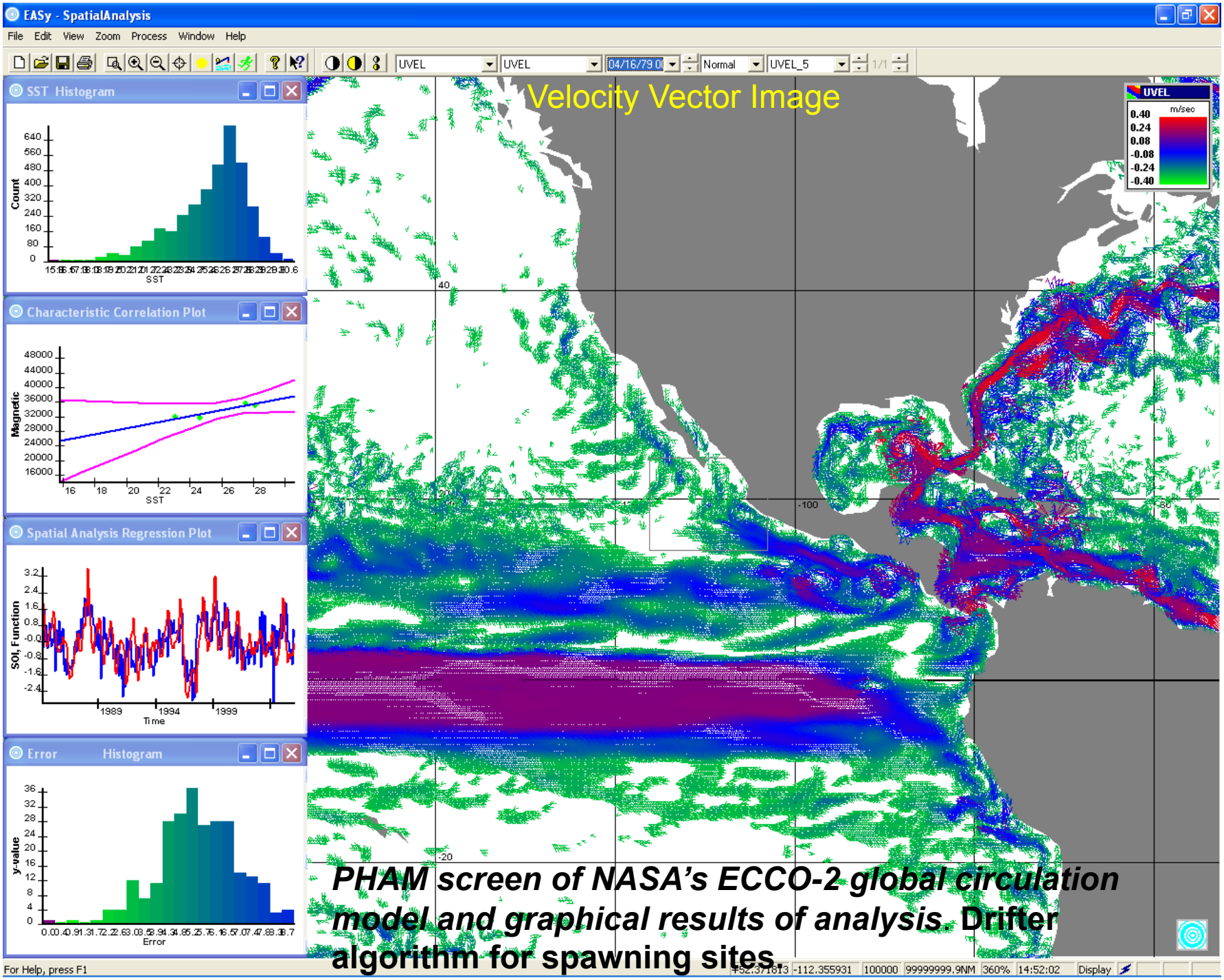


PHAM screen of habitat analysis interface, map of calculated spawning sites, and graphical results of analysis

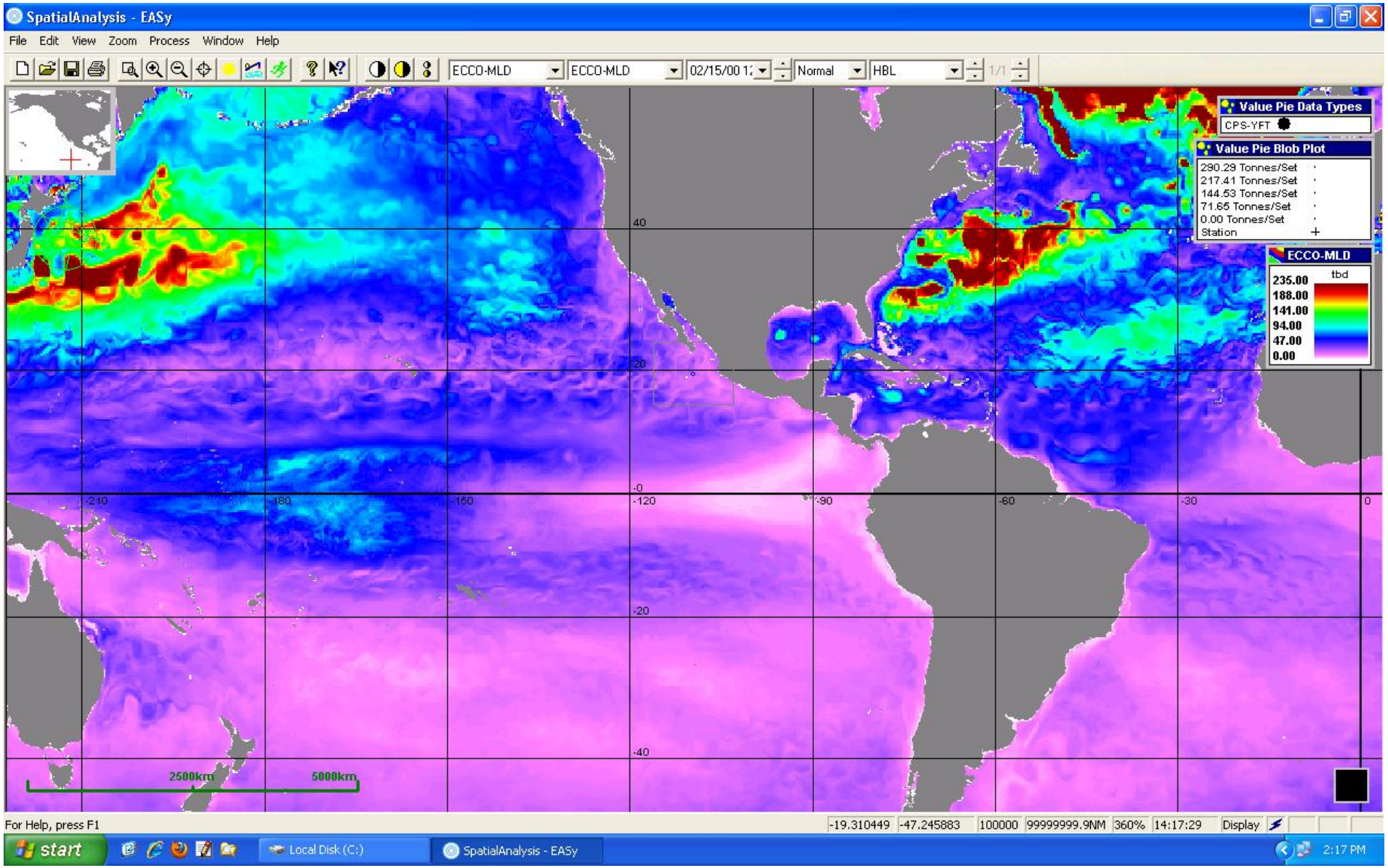


GHRSST Sea Surface Temperature


SST Frontal Probability Index: June 1988
Data source: GHRSST Level 4 .25deg AVHRR_OI SST (Reynolds)
SST Frontal Probability (%) 1988-06-01 to 1988-06-30
0
20
40
60
80
100

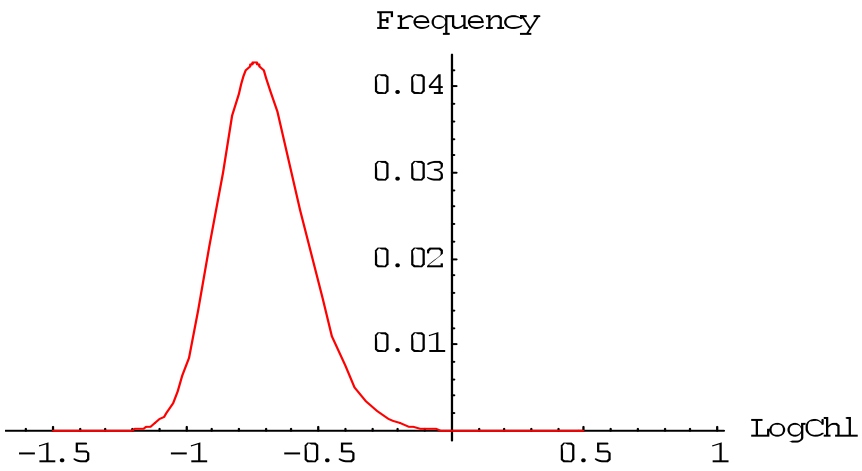


PHAM screen of NASA's ECCO-2 global circulation model and graphical results of analysis. **Drifter algorithm for spawning sites.**

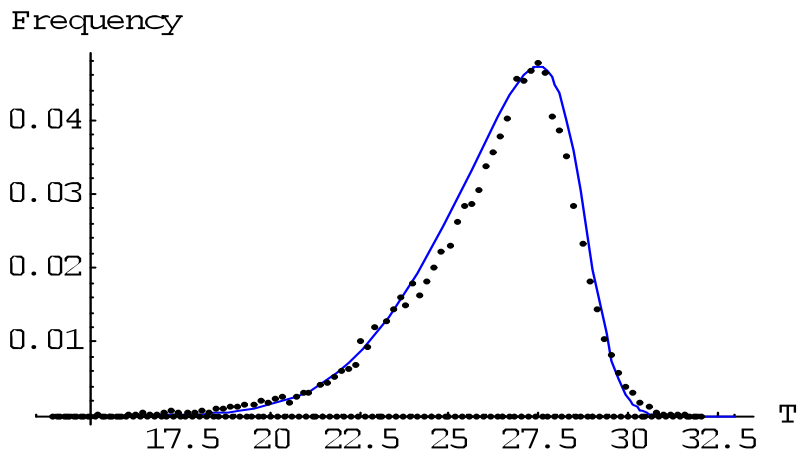


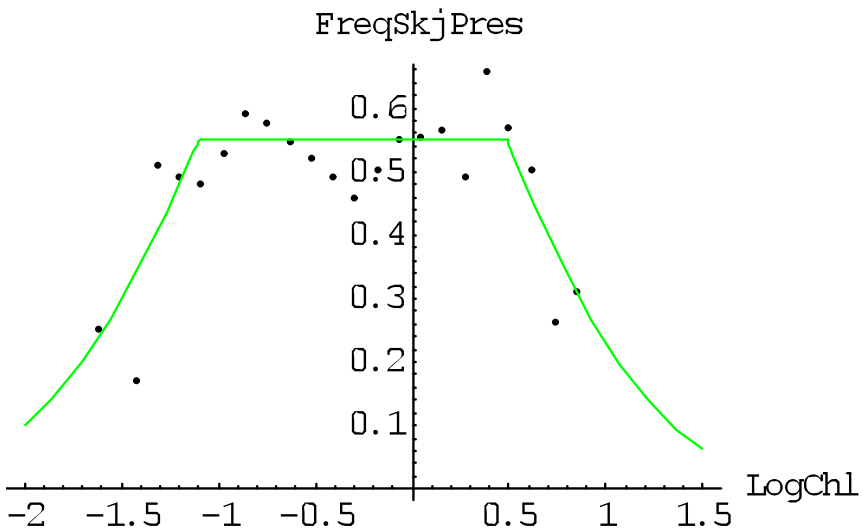
NASA ECCO2 Global Circulation Model – Mixed Layer Depth

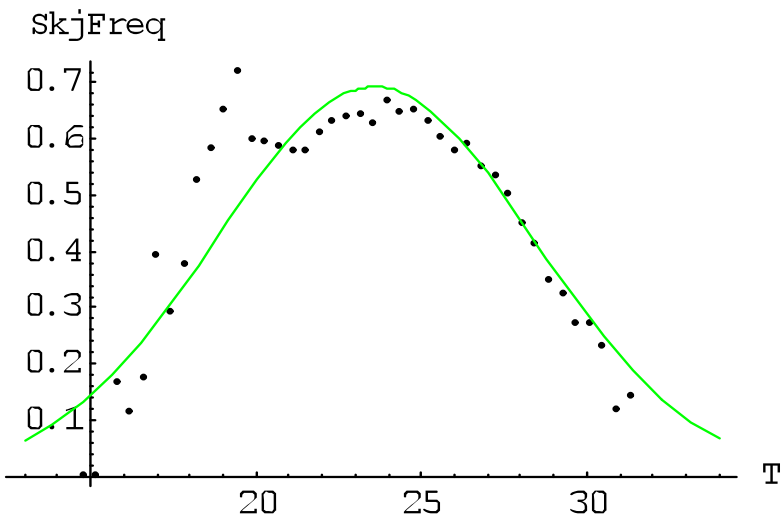
Chlorophyll



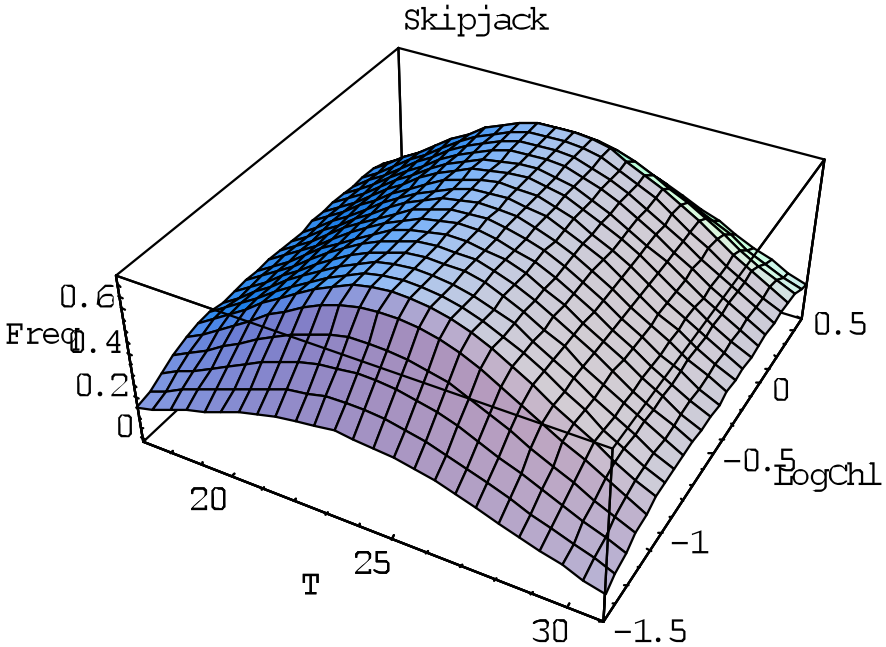
GHRSST

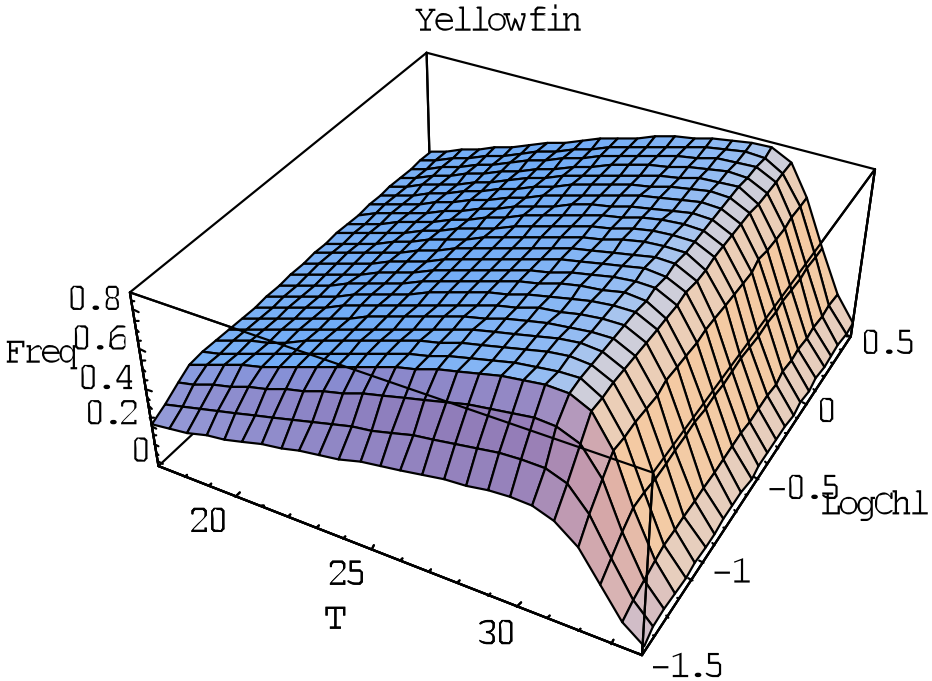


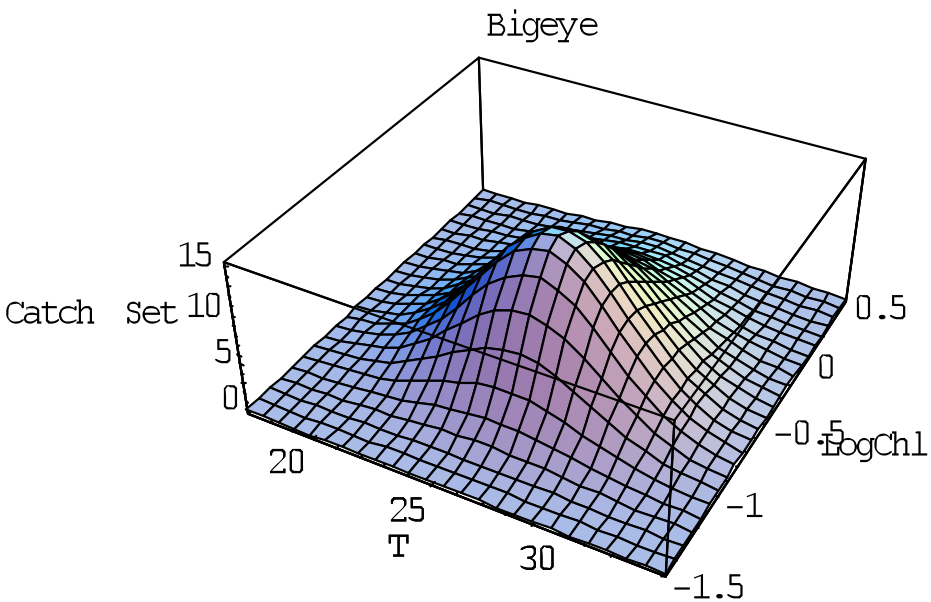


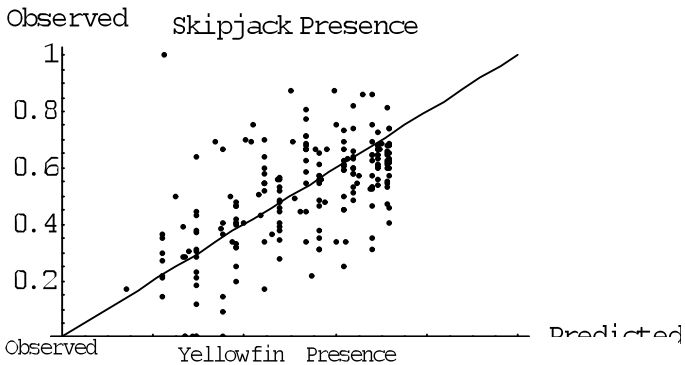


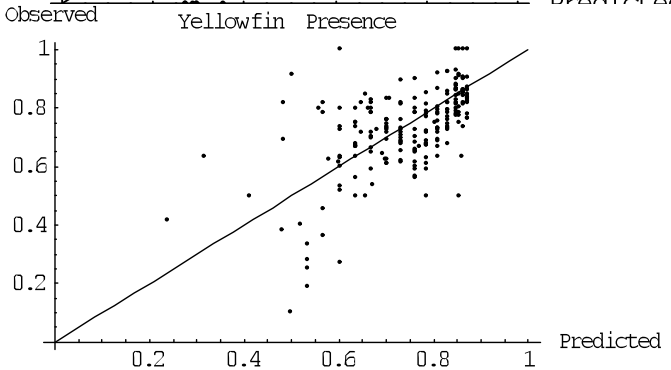
Distributions generated from PHAM output

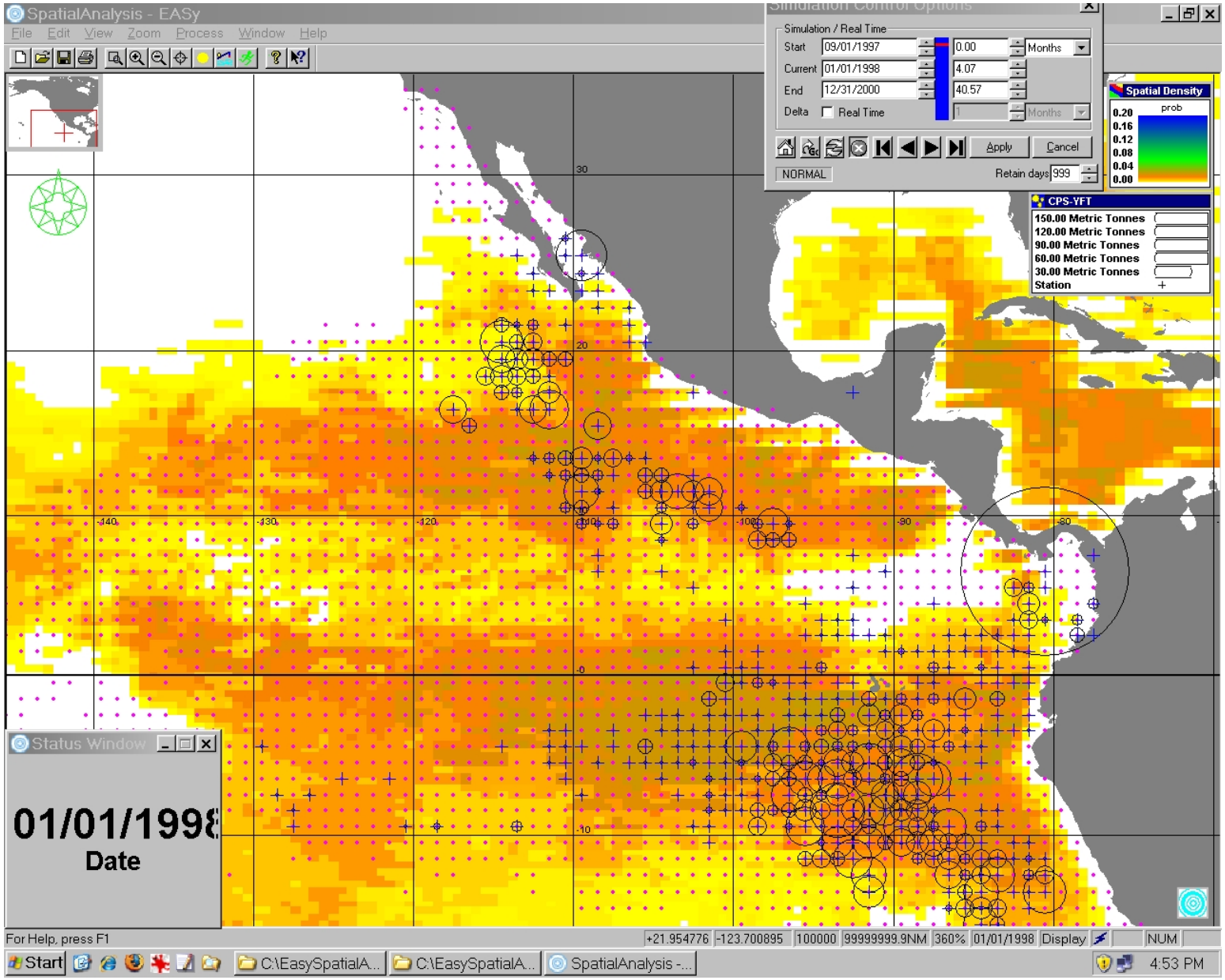

Skipjack
Freq
0.6
0.4
0.2
0
20
25
30
T
0.5
0
-0.5
-1
-1.5
LogChl


Yellowfin
Freq
0.8
0.6
0.4
0.2
0
20
25
30
T
0.5
0
-0.5
-1
-1.5
LogChl

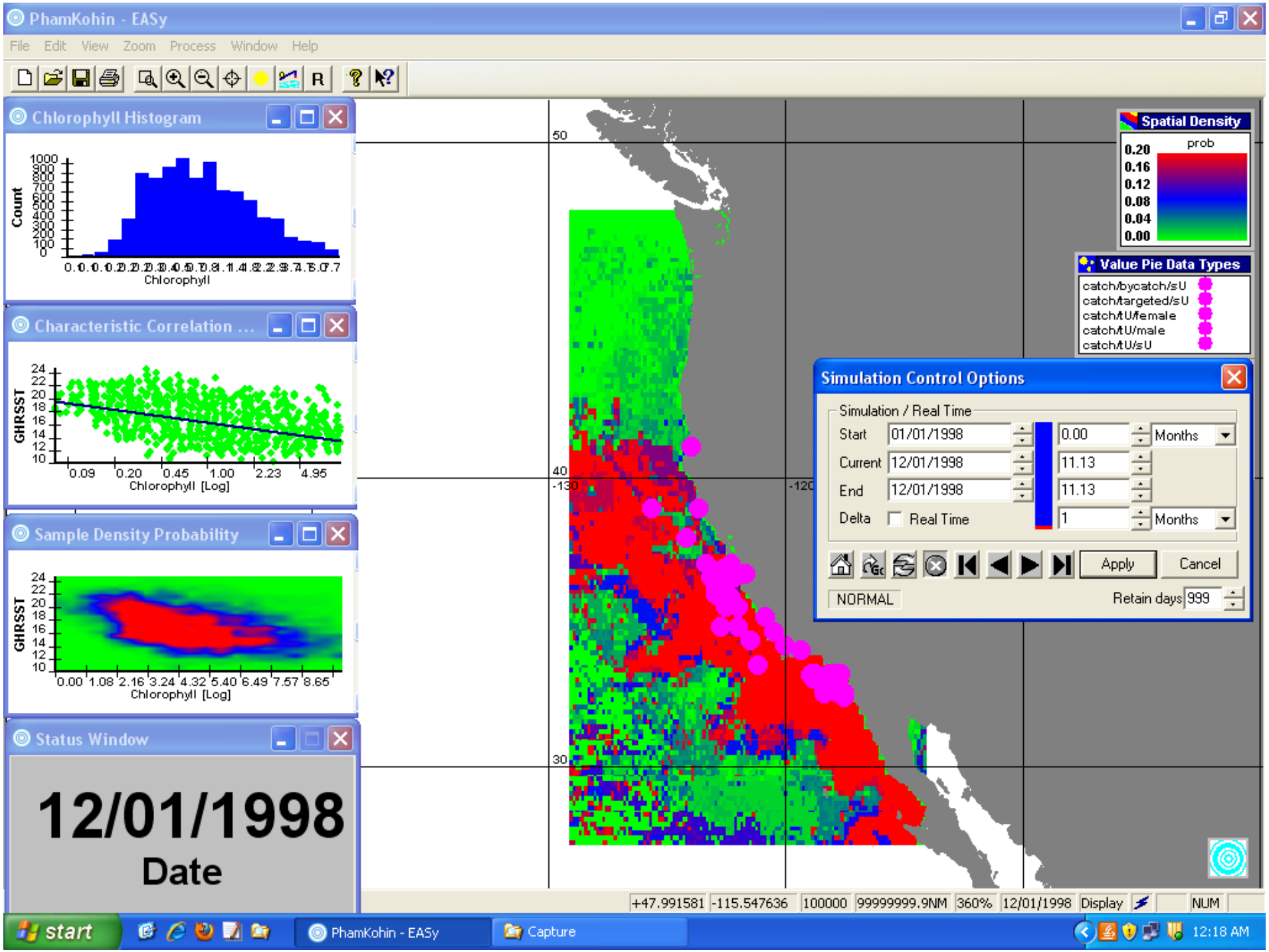

Bigeye
Catch Set
15
10
5
0
20
25
30
T
0.5
0
-0.5
-1
-1.5
LogChl


Observed
Skipjack Presence
1
0.8
0.6
0.4
0.2
Predicted


Observed
Yellowfin Presence
1
0.8
0.6
0.4
0.2
0.2
0.4
0.6
0.8
1
Predicted



PHAM screen of critical habitat of skipjack tuna as calculated from habitat analysis and current satellite imagery.


PhamKohin - EASy
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Chlorophyll Histogram
Count
Chlorophyll
Characteristic Correlation ...
GHRSST
Chlorophyll [Log]
Sample Density Probability
GHRSST
Chlorophyll [Log]
Status Window
12/01/1998
Date
Spatial Density
prob
0.20
0.16
0.12
0.08
0.04
0.00
Value Pie Data Types
catch/bycatch/sU
catch/targeted/sU
catch/tU/female
catch/tU/male
catch/tU/sU
Simulation Control Options
Simulation / Real Time
Start 01/01/1998 0.00 Months
Current 12/01/1998 11.13
End 12/01/1998 11.13
Delta Real Time 1 Months
Apply
Cancel
NORMAL
Retain days 999
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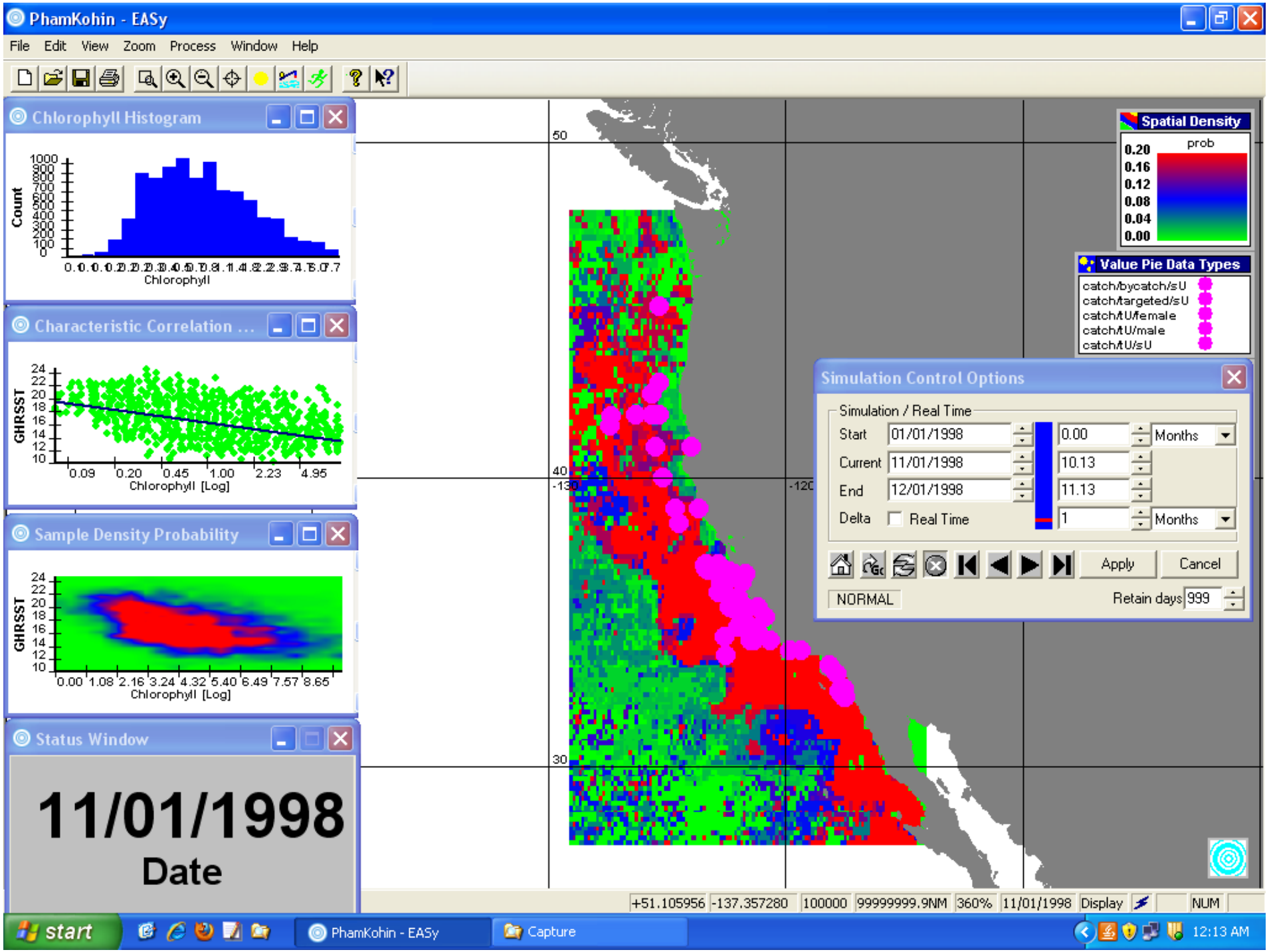
Capture
12:18 AM


PhamKohin - EASy
File Edit View Zoom Process Window Help
Chlorophyll Histogram
Count
Chlorophyll
Characteristic Correlation ...
GHRSST
Chlorophyll [Log]
Sample Density Probability
GHRSST
Chlorophyll [Log]
Status Window
11/01/1998
Date
Spatial Density
prob
0.20
0.16
0.12
0.08
0.04
0.00
Value Pie Data Types
catch/bycatch/sU
catch/targeted/sU
catch/tU/female
catch/tU/male
catch/tU/sU
Simulation Control Options
Simulation / Real Time
Start 01/01/1998 0.00 Months
Current 11/01/1998 10.13
End 12/01/1998 11.13
Delta Real Time 1 Months
Apply
Cancel
NORMAL
Retain days 999
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Capture
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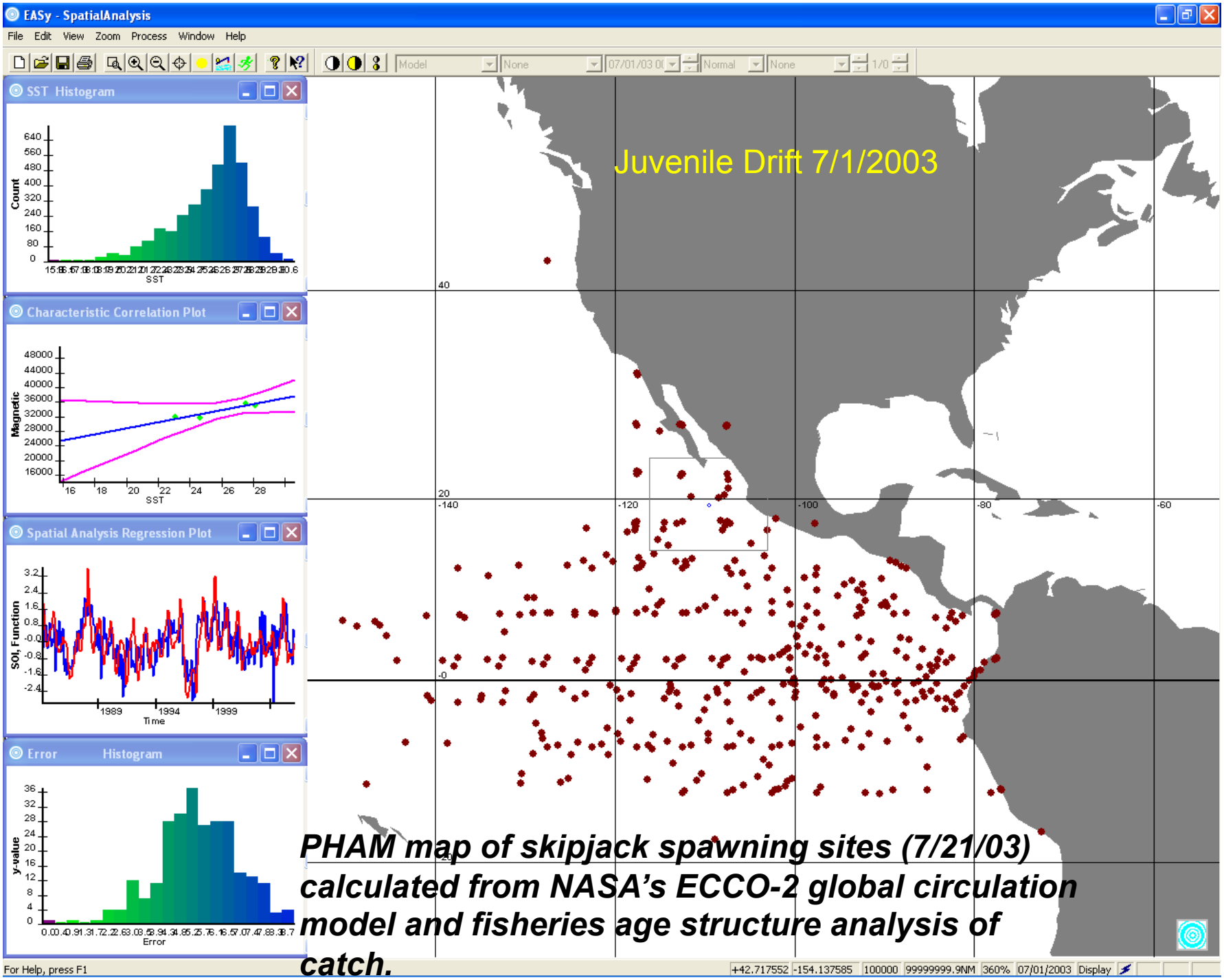
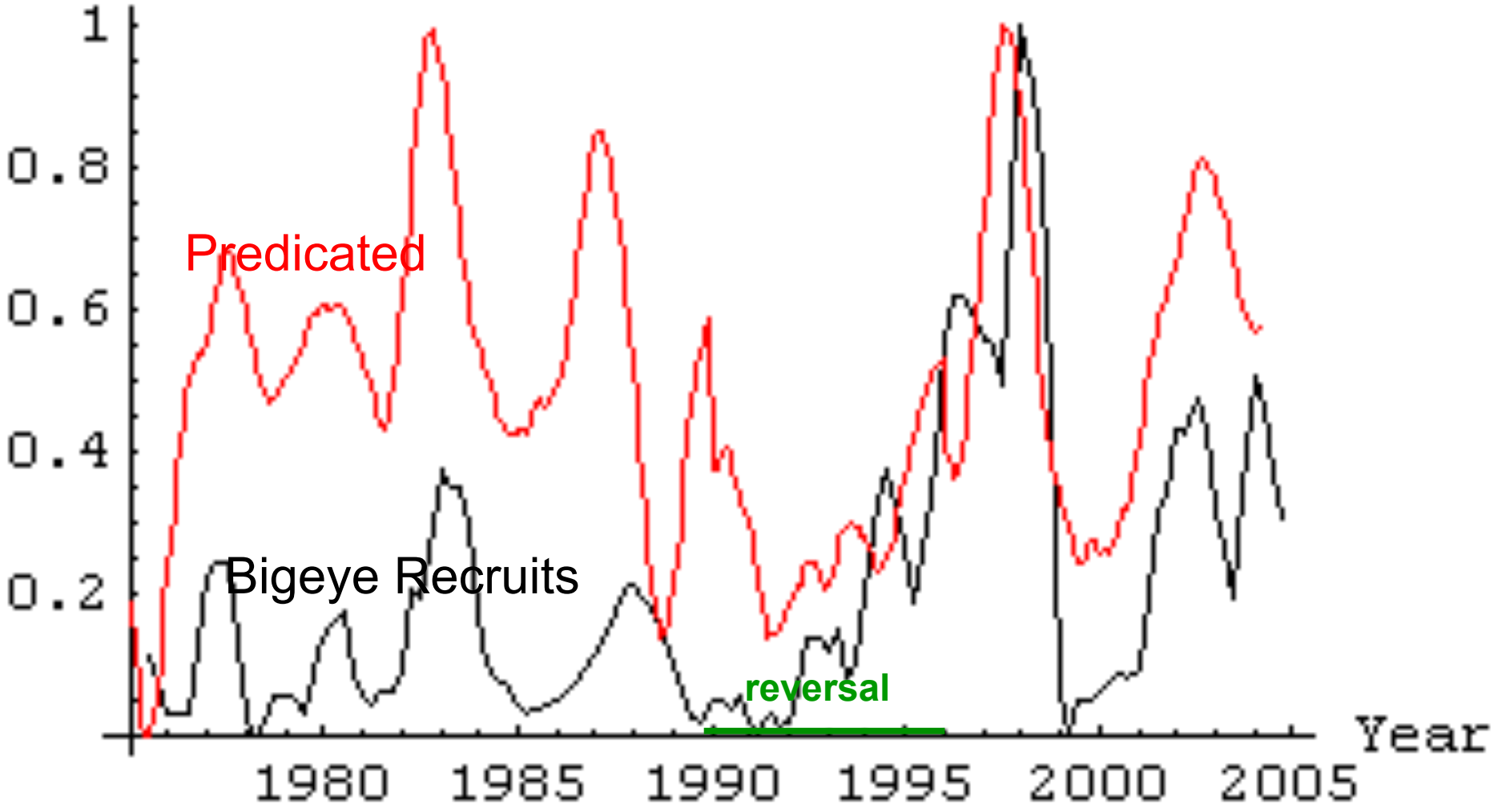


PHAM map of skipjack spawning sites (7/21/03) calculated from NASA's ECCO-2 global circulation model and fisheries age structure analysis of catch.

A Simple Loophole Algorithm of Transforming
SOI into SS2 Calculations of Bigeye Recruitment