List of Figures

List of Tables

HURDAT data. http://www.aoml.noaa.gov/hrd/hurdat/Data Storm.html

IMSL Mathematical & Statistical Libraries. http://www.vni.com/products/imsl

Java Native Interface. http://java.sun.com/docs/books/tutorial/native1.1/

Java Server Pages (TM) Technology. http://java.sun.com/products/jsp/

National Hurricane Center. http://www.nhc.noaa.gov/

NIST Aerodynamic Database - http://fris2.nist.gov/winddata

NOAA Coastal Services Center. http:www.csc.noaa.gov

NOAA EL Nino Page. http://www.elnino.noaa.gov/

NOAA LA Nina Page. http://www.elnino.noaa.gov/lanina.html

PHRLM Manual. http://www.cis.fiu.edu/hurricaneloss

RAMS: Regional Atmospheric Modeling System. http://rams.atmos.colostate.edu/

R.L. Walko, C.J. Tremback, “RAMS: regional atmospheric modeling system, version 4.3/4.4 - Introduction to RAMS 4.3/4.4.” http://www.atmet.com/html/docs/rams/ug44-rams-intro.pdf

RMS home page. http://www.rms.com

The JDBC API Universal Data Access for the Enterprise. http://java.sun.com/products/jdbc/overview.html

The Interactive Data Language. http://www.rsinc.com/idl/

Track of hurricane Andrew (1992) (Source from NOVA). http://www.pbs.org/newshour/science/hurricane/facts.html

Tropical cyclone heat potential: http://www.aoml.noaa.gov/phod/cyclone/data/

The Ptolemy Java Applet package. http://ptolemy.eecs.berkeley.edu/papers/99/HMAD/html/plotb.html

Florida Water Management District Land Use Data, Statewide 2004-2011, as compiled by the Florida State Department of Environmental Protection: http://www.dep.state.fl.us/gis/datadir.htm

Actual data is at
http://publicfiles.dep.state.fl.us/otis/gis/data/STATEWIDE_LANDUSE_2004_2011.zip

5. ***Provide the following information related to changes in the model from the previously accepted submission to the initial submission this year.***

   A. ***Model changes:***

      1. ***A summary description of changes that affect the personal or commercial residential loss costs or probable maximum loss levels,***

Meteorological Component

- We updated to a recent version of ~~HURDAT~~HURDAT2 (4/1/2014) which includes storms up through the 2013 season.
- We updated the land use/land cover data set using MRLC NLCD 2011 and the Statewide 2004-2011 Florida Water Management District data set as per Standard M-4.
- We updated the zip code database to the December, 2013 ZIP code boundaries as per Standard G-3.
- The *Rmax* database was revised to include recent storms and revisions to historical storms.

Vulnerability Component

a. The changes in the low-rise CR model include:
   - Projectile count increase in debris impact model
   - Interior pressure sharing between attic and top floor changed
   - Interior pressure calculation in the attic space due to sheathing loss changed
   - Change in the soffit damage computation
   - Reductions in the pressure coefficient (C_p) multiplier
   - Modification of the masonry wall area failure function and its differentiation between unreinforced and reinforced masonry.
   - Changes in the rain admittance factor (RAF) values and incorporation of the new surface run-off coefficient
   - Replacement of the directionality factor (f_{sim}) with a more sophisticated directionality scheme
   - The statistics used to weigh the low-rise CR vulnerability matrices were updated.

b. The changes in the damage evaluation of Mid/high-rise CR model include

- An additional volume of water penetration was modeled at the upper story of Mid/high-rise CR model

2. ***A list of all other changes, and***

No other changes are reported.

3. ***The rationale for each change.***

Meteorological Component

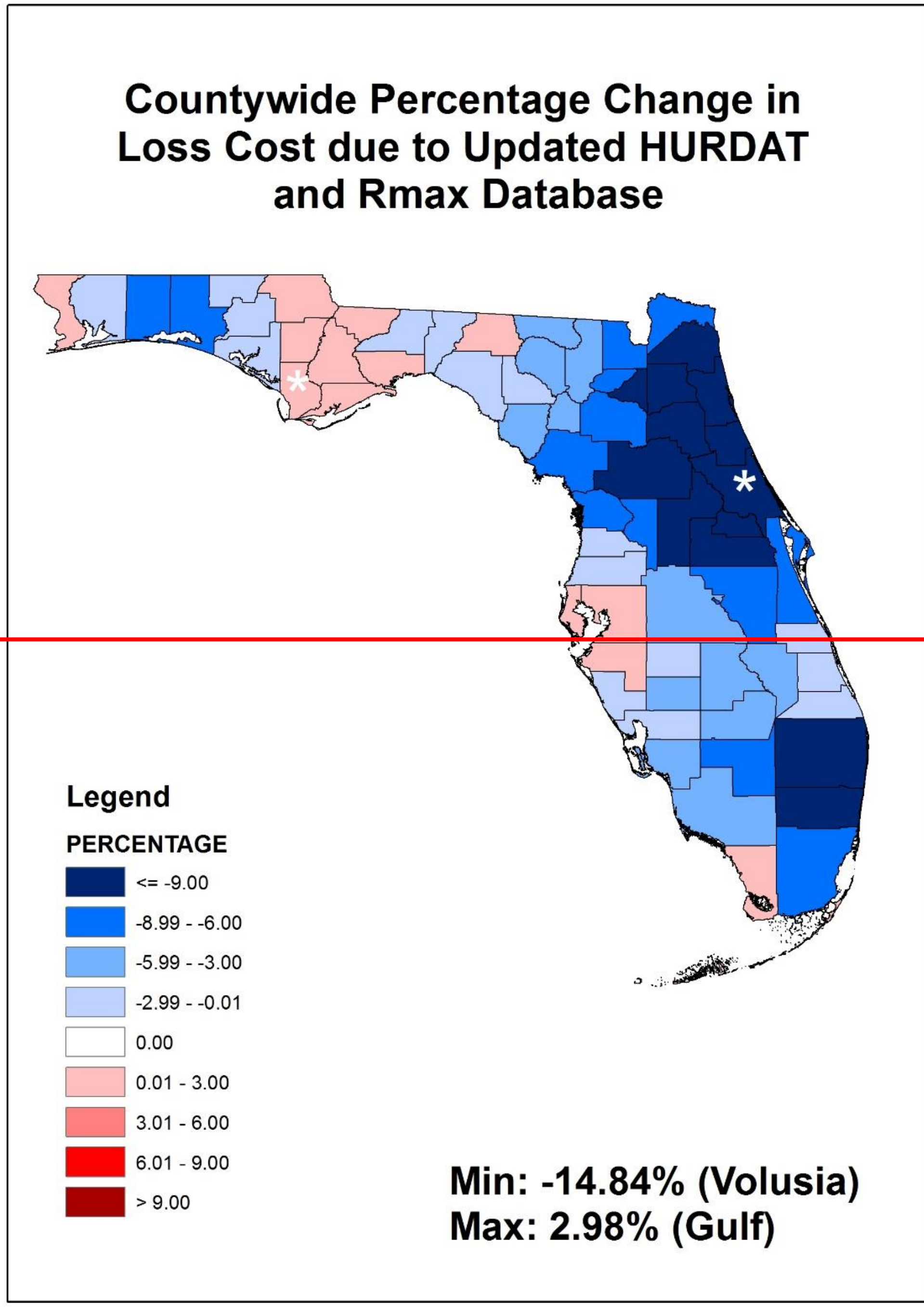
- Change made to update to ~~the latest HURDAT~~a recent version of HURDAT2 (4/1/2014) and to take advantage of new observations of *Rmax* that have recently become available for storms that have occurred up to the 2012 hurricane season.

- Updated centroid locations as per Standard G-3 and terrain roughness as per Standard M-4 B.

Vulnerability Component

<u>For LR CR:</u>

- The projectile count in the debris impact model was modified to better reflect P(projectile impact | story height).
- The interior pressure sharing mechanism between attic and top floor was modified to reflect the change in internal pressure sharing due to top floor breaches.
- Interior pressure calculation in the attic space was changed to delineate internal pressure contributions from the flow regimes associated with windward and leeward roof sheathing damage
- The location of the soffit damage routine was modified to better reflect the influence of internal pressure on soffit failure.
- The pressure coefficient (C_p) was modified to reduce an overly-conservative extreme load assumption, and to bring the LR CR model into compliance with the personal residential model
- In the case of masonry structures, the damage simulations give the exceedance of the ultimate moment and shear capacities of the masonry wall for both unreinforced (weak models) and reinforced masonry (medium and strong models). Heuristic curves relate the % of masonry capacity exceedance to a % of wall failure, for both shear or out of plane bending. The original heuristics used in v5.0 of the FPHLM did not distinguish between unreinforced and reinforced masonry. A set of heuristics was implemented in the new version of the vulnerability model, which takes into account the differences in behavior between unreinforced and reinforced masonry.


Countywide Percentage Change in
Loss Cost due to Updated HURDAT
and Rmax Database
Legend
PERCENTAGE
<= -9.00
-8.99 - -6.00
-5.99 - -3.00
-2.99 - -0.01
0.00
0.01 - 3.00
3.01 - 6.00
6.01 - 9.00
> 9.00
Min: -14.84% (Volusia)
Max: 2.98% (Gulf)

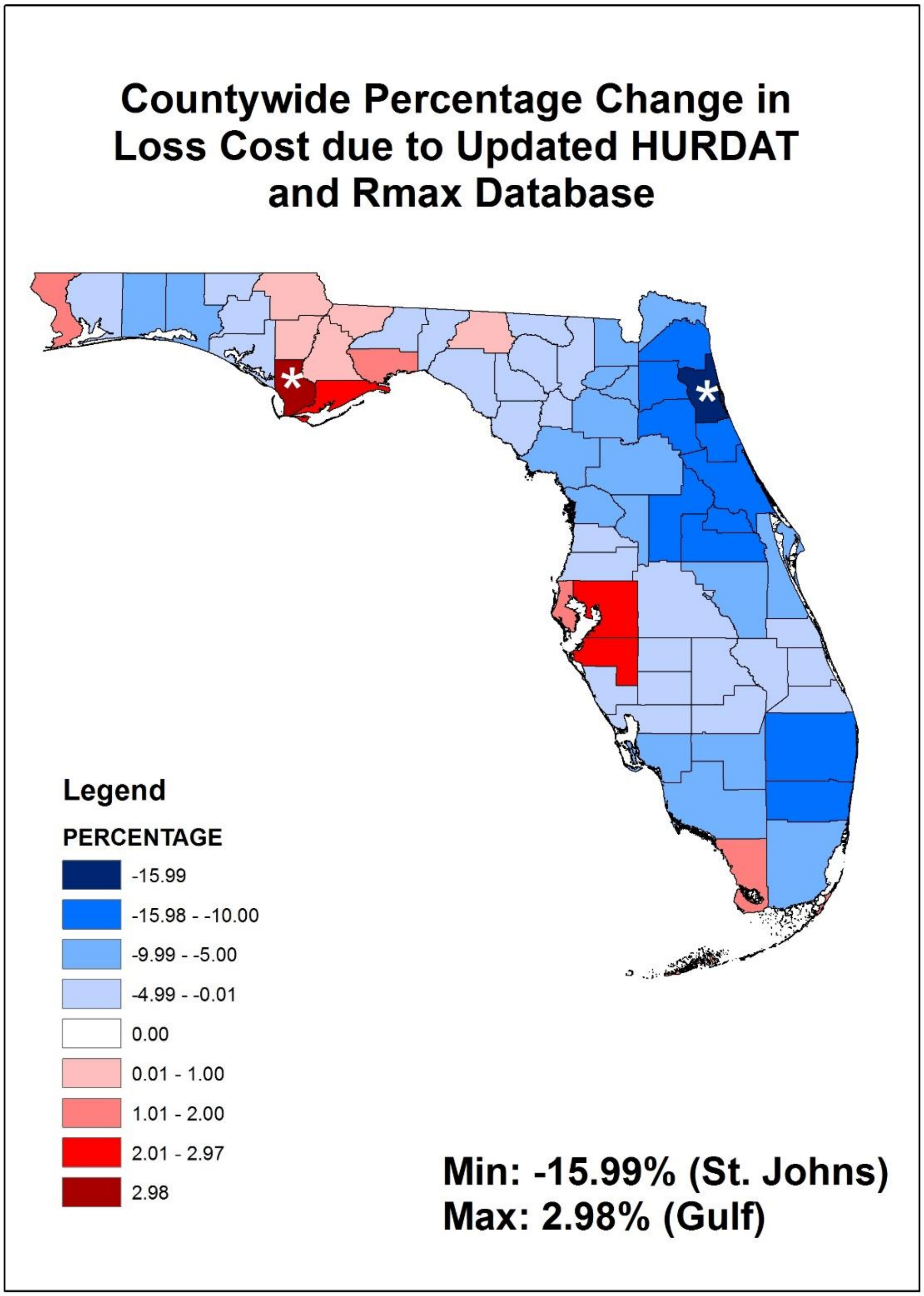
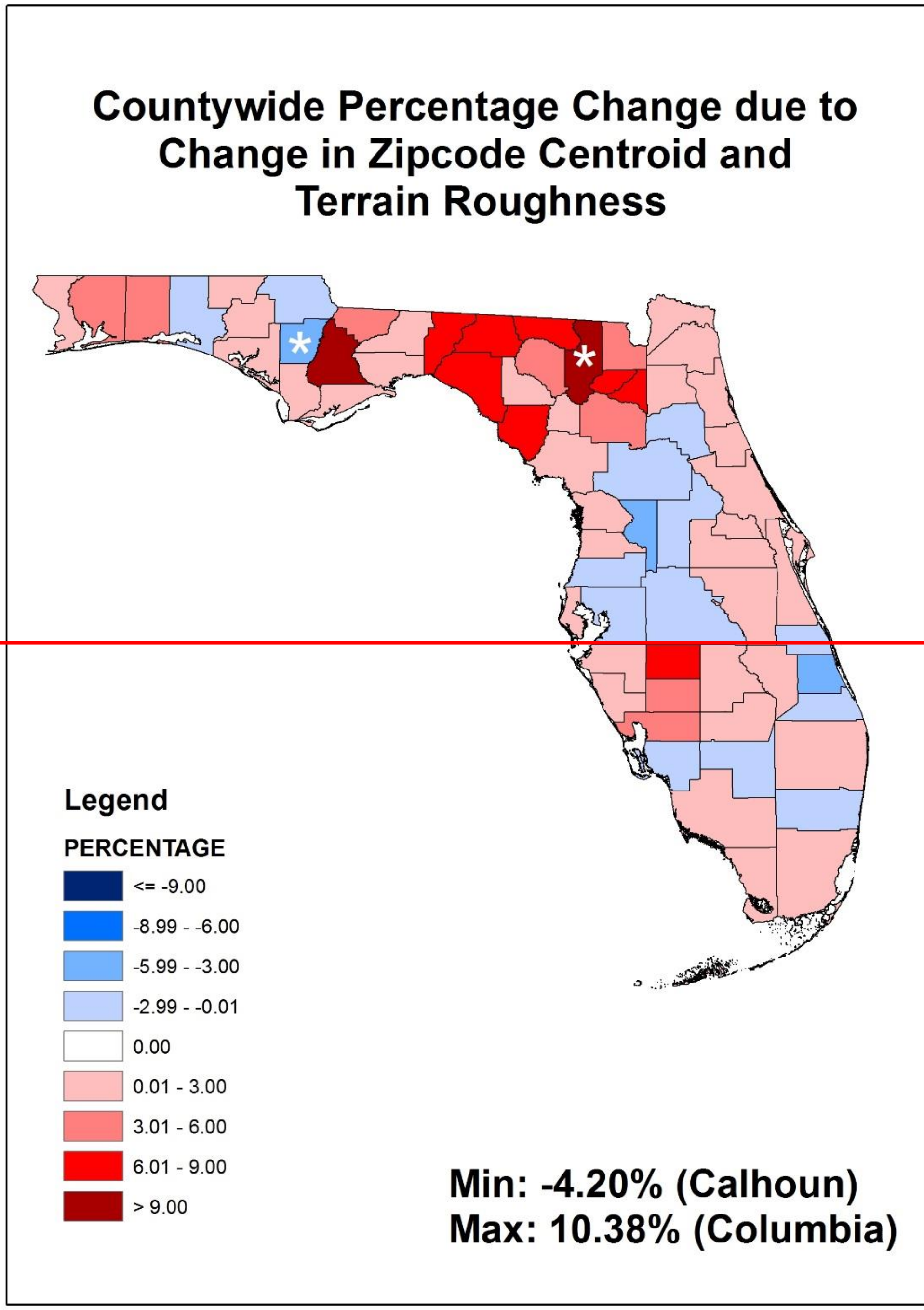


Figure 20. Countywide Percentage Change in Loss Cost due to Updated HURDAT and Rmax Database


Countywide Percentage Change due to
Change in Zipcode Centroid and
Terrain Roughness
Legend
PERCENTAGE
<= -9.00
-8.99 - -6.00
-5.99 - -3.00
-2.99 - -0.01
0.00
0.01 - 3.00
3.01 - 6.00
6.01 - 9.00
> 9.00
Min: -4.20% (Calhoun)
Max: 10.38% (Columbia)

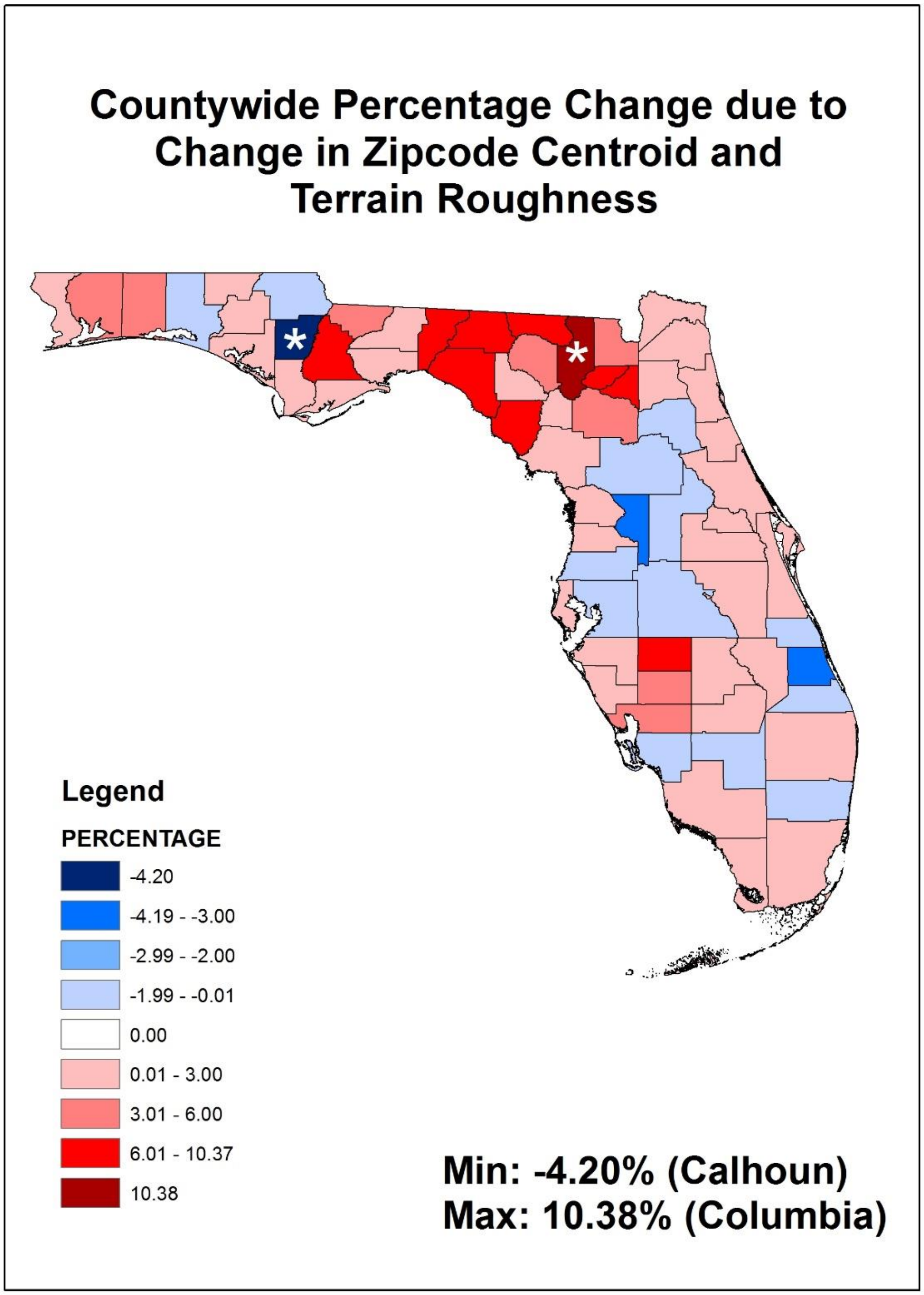
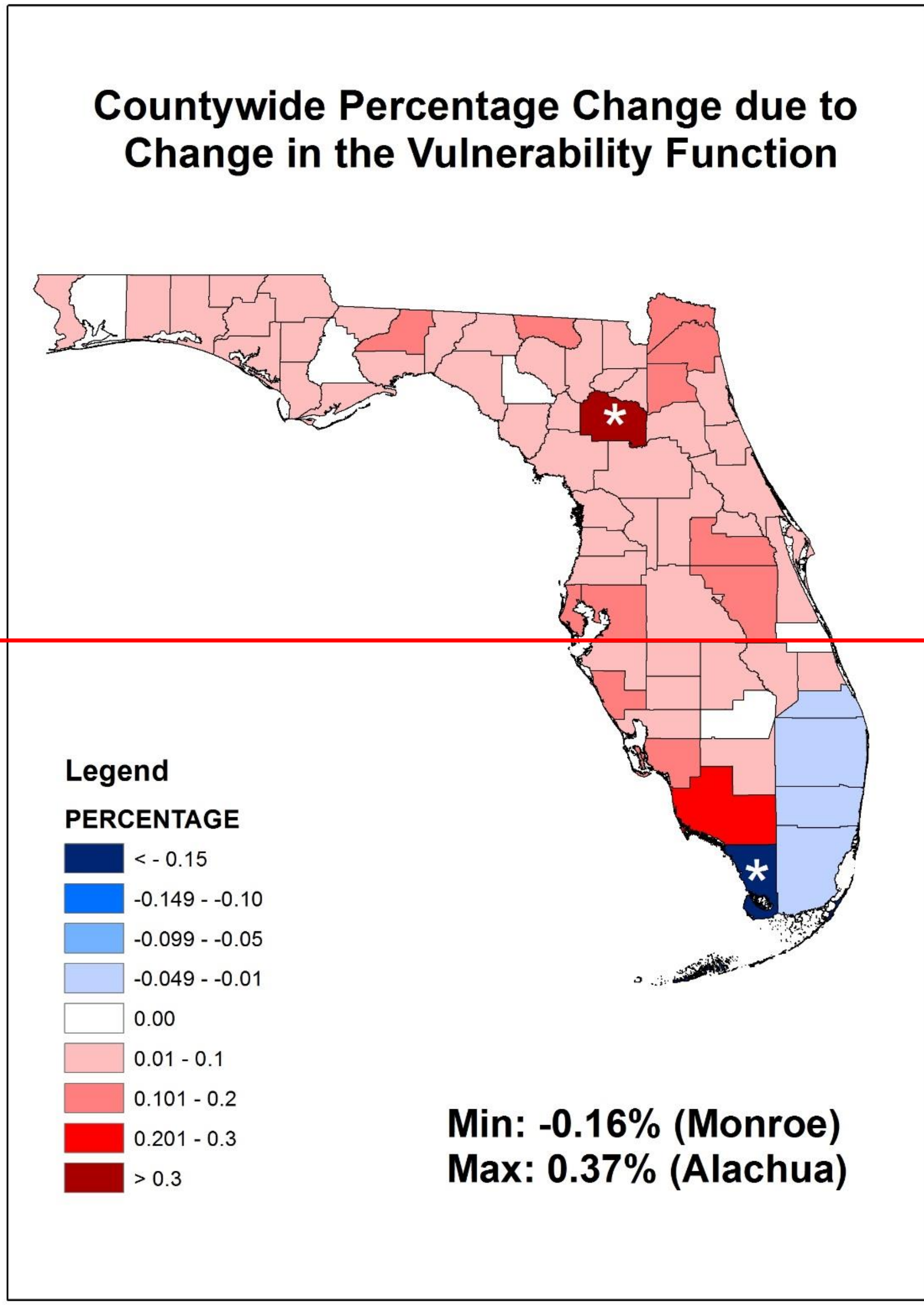


Figure 21. Countywide Percentage Change due to Change in Zipcode Centroid and Terrain Roughness


Countywide Percentage Change due to
Change in the Vulnerability Function
Legend
PERCENTAGE
< - 0.15
-0.149 - -0.10
-0.099 - -0.05
-0.049 - -0.01
0.00
0.01 - 0.1
0.101 - 0.2
0.201 - 0.3
> 0.3
Min: -0.16% (Monroe)
Max: 0.37% (Alachua)

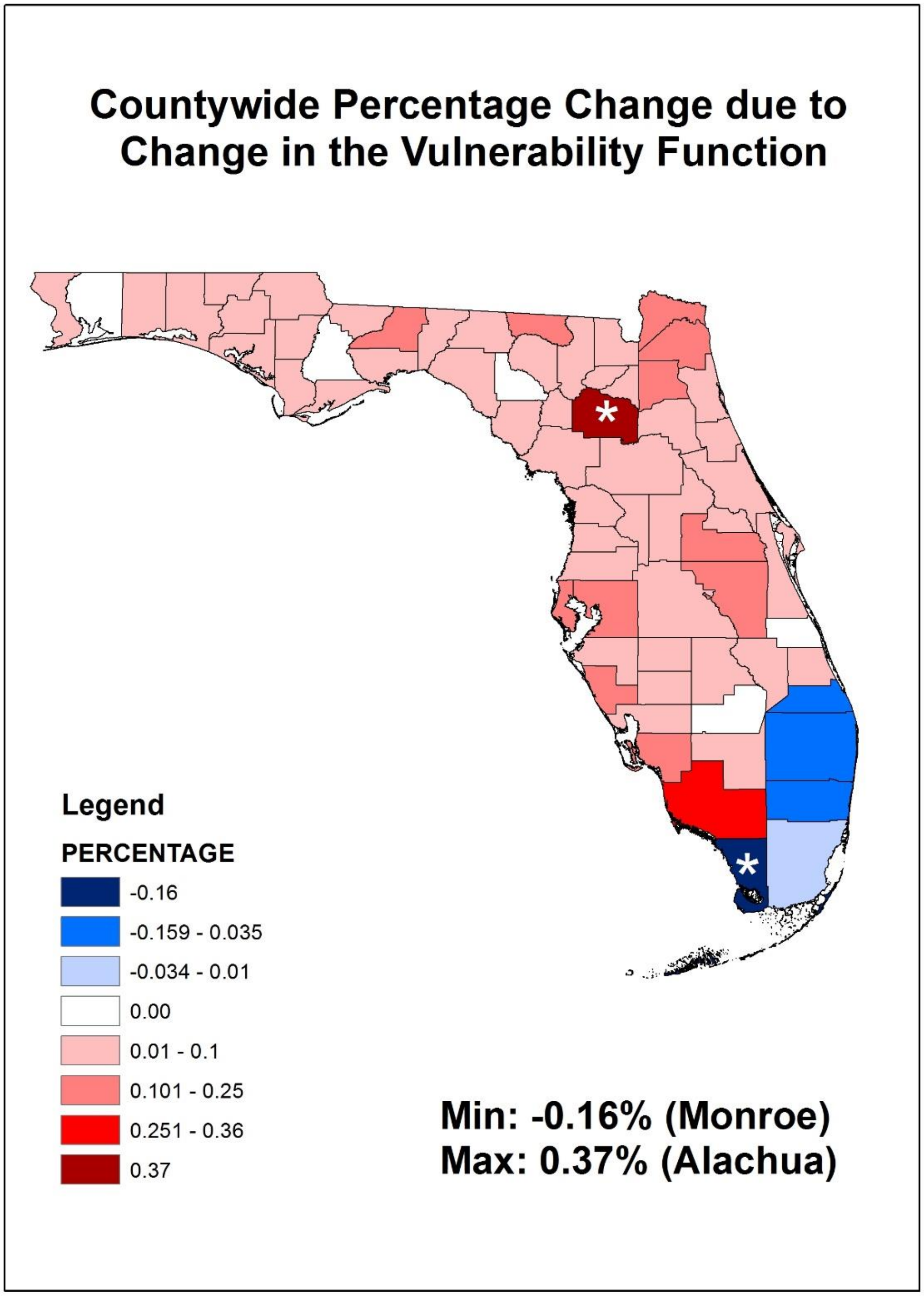


Figure 22. Countywide Percentage Change due to Change in the Vulnerability Function

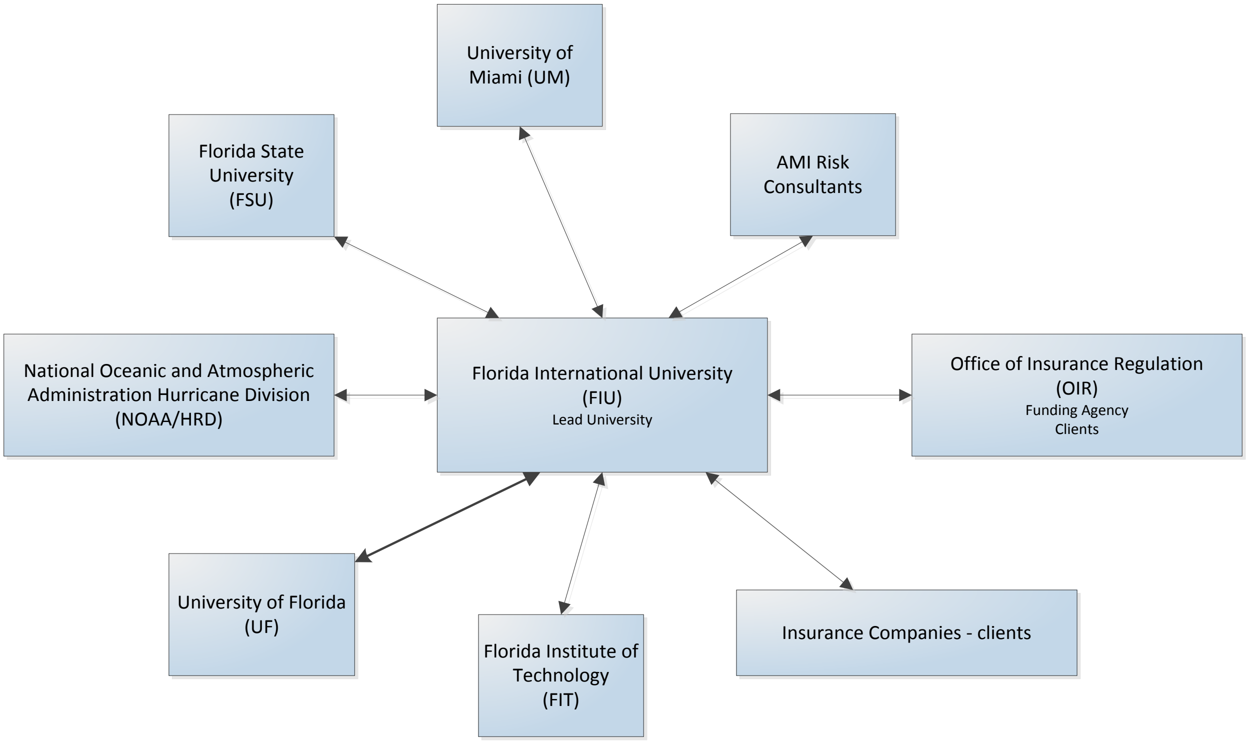


Figure 23. Organizational structure.

The Florida Office of Insurance Regulation (OIR) contracted and funded Florida International University to develop the Florida Public Hurricane Loss Model. The model is based at the Laboratory for Insurance, Financial and Economic Research, which is part of the International Hurricane Research Center at Florida International University. The OIR did not influence the development of the model. The model was developed independently by a team of professors, experts, and graduate students working primarily at Florida International University, Florida Institute of Technology, Florida State University, University of Florida, Hurricane Research Division of NOAA, University of Miami, and AMI Risk Consultants. The copyright for the model belongs to OIR.

C. ***If the model is developed by an entity other than a modeling company, describe the funding source for the model.***

The model was funded by the state legislature at the request of the Florida Office of Insurance Regulation.

D. ***Describe the modeling organization's services.***

Until 2008 the modeler provided services to only one major client, the FL-OIR. Effective January 2009 the modeler is providing services to the firms and organizations in the insurance and reinsurance industries. It has expanded the infrastructure and computational capacity to handle the added load.

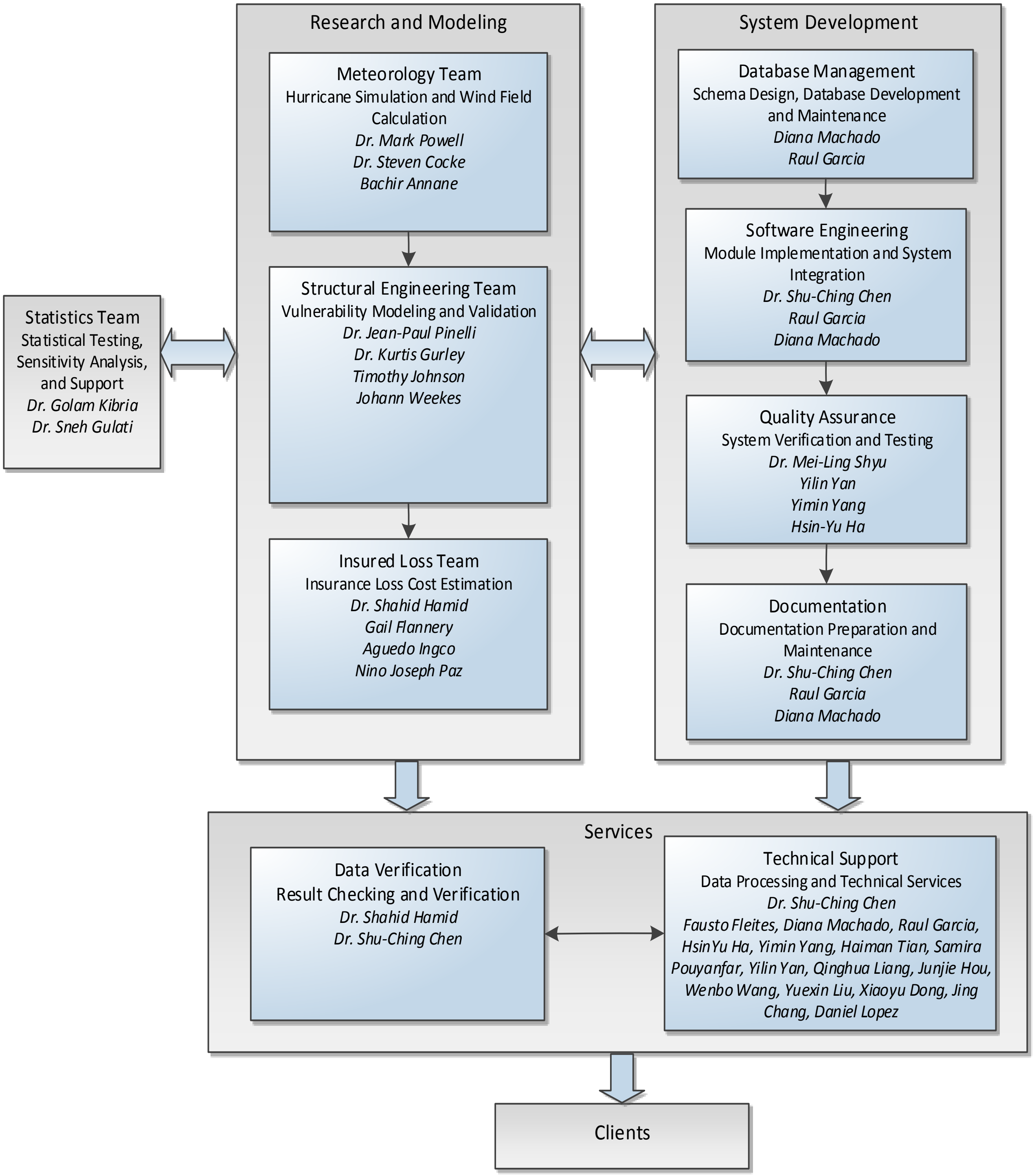


Figure 24. Florida Public Hurricane Loss Model workflow.

Form G-1

I hereby certify that I have reviewed the current submission of FLORIDA PUBLIC HURRICANE LOSS MODEL
(Name of Model)
Version 6.0 for compliance with the 2013 Standards adopted by the Florida Commission on Hurricane Loss Projection Methodology and hereby certify that:

1) The model meets the Statistical Standards (S1 – S6);
2) The disclosures and forms related to the Statistical Standards section are editorially and technically accurate, reliable, unbiased, and complete;
3) My review was completed in accordance with the professional standards and code of ethical conduct for my profession; and
4) In expressing my opinion I have not been influenced by any other party in order to bias or prejudice my opinion.

SHAHID HAMID	PHD (Financial Economics)
Name	Professional Credentials (area of expertise)
S. Hamid	10/28/2014
Signature (original submission)	Date
Signature (response to deficiencies, if any)	Date
Signature (revisions to submission, if any)	Date
Signature (final submission)	Date

An updated signature and form is required following any modification of the model and any revision of the original submission. If a signatory differs from the original signatory, provide the printed name and professional credentials for any new signatories. Additional signature lines shall be added as necessary with the following format:

Signature (revisions to submission)	Date

Note: A facsimile or any properly reproduced signature will be acceptable to meet this requirement.

99

I hereby certify that I have reviewed the current submission of FLORIDA PUBLIC HURRICANE LOSS MODEL
(Name of Model)

Version 6.0 for compliance with the 2013 Standards adopted by the Florida Commission on Hurricane Loss Projection Methodology and hereby certify that:

1) The model meets the Statistical Standards (S1 – S6);
2) The disclosures and forms related to the Statistical Standards section are editorially and technically accurate, reliable, unbiased, and complete;
3) My review was completed in accordance with the professional standards and code of ethical conduct for my profession; and
4) In expressing my opinion I have not been influenced by any other party in order to bias or prejudice my opinion.

SHAHID HAMID	PHD (Financial Economics)
Name	Professional Credentials (area of expertise)
S. Hamid	10/23/2014
Signature (original submission)	Date
S. Hamid	1/5/2015
Signature (response to deficiencies, if any)	Date
Signature (revisions to submission, if any)	Date
Signature (final submission)	Date

An updated signature and form is required following any modification of the model and any revision of the original submission. If a signatory differs from the original signatory, provide the printed name and professional credentials for any new signatories. Additional signature lines shall be added as necessary with the following format:

Signature (revisions to submission)	Date

Note: A facsimile or any properly reproduced signature will be acceptable to meet this requirement.

Form G-2

Form G-2: Meteorological Standards Expert Certification

I hereby certify that I have reviewed the current submission of ______________________________
(Name of Model)
Version 6.0 for compliance with the 2013 Standards adopted by the Florida Commission on Hurricane Loss Projection Methodology and hereby certify that:

1) The model meets the Meteorological Standards (M1 – M6);
2) The disclosures and forms related to the Meteorological Standards section are editorially and technically accurate, reliable, unbiased, and complete;
3) My review was completed in accordance with the professional standards and code of ethical conduct for my profession; and
4) In expressing my opinion I have not been influenced by any other party in order to bias or prejudice my opinion.

MARK D. POWELL
Name

Meteorology
Professional Credentials (area of expertise)

[signature]
Signature (original submission)

10-23-2014
Date

____
Signature (response to deficiencies, if any)

____
Date

____
Signature (revisions to submission, if any)

____
Date

____
Signature (final submission)

____
Date

An updated signature and form is required following any modification of the model and any revision of the original submission. If a signatory differs from the original signatory, provide the printed name and professional credentials for any new signatories. Additional signature lines shall be added as necessary with the following format:

____
Signature (revisions to submission)

____
Date

Note: A facsimile or any properly reproduced signature will be acceptable to meet this requirement.

Form G-2: Meteorological Standards Expert Certification

I hereby certify that I have reviewed the current submission of **Florida Public Hurricane Loss Model**
(Name of Model)
Version 6.0 for compliance with the 2013 Standards adopted by the Florida Commission on Hurricane Loss Projection Methodology and hereby certify that:

1) The model meets the Meteorological Standards (M1 – M6);
2) The disclosures and forms related to the Meteorological Standards section are editorially and technically accurate, reliable, unbiased, and complete;
3) My review was completed in accordance with the professional standards and code of ethical conduct for my profession; and
4) In expressing my opinion I have not been influenced by any other party in order to bias or prejudice my opinion.

MARK D. POWELL
Name

Meteorology
PhD in Meteorology
Certified Consulting Meteorologist
AMS Fellow
Professional Credentials (area of expertise)

Signature (original submission)
10-23-2014
Date

Signature (response to deficiencies, if any)
12-22-2014
Date

Signature (revisions to submission, if any)
Date

Signature (final submission)
Date

An updated signature and form is required following any modification of the model and any revision of the original submission. If a signatory differs from the original signatory, provide the printed name and professional credentials for any new signatories. Additional signature lines shall be added as necessary with the following format:

Signature (revisions to submission)
Date

Note: A facsimile or any properly reproduced signature will be acceptable to meet this requirement.

98

Form G-3

Form G-3: Statistical Standards Expert Certification

I hereby certify that I have reviewed the current submission of FPHLM
(Name of Model)
Version 6.0 for compliance with the 2013 Standards adopted by the Florida Commission on Hurricane Loss Projection Methodology and hereby certify that:

1) The model meets the Statistical Standards (S1 – S6);
2) The disclosures and forms related to the Statistical Standards section are editorially and technically accurate, reliable, unbiased, and complete;
3) My review was completed in accordance with the professional standards and code of ethical conduct for my profession; and
4) In expressing my opinion I have not been influenced by any other party in order to bias or prejudice my opinion.

SNEH GULATI
Name

STATISTICS
Professional Credentials (area of expertise)

Signature (original submission)

10/27/2014
Date

Signature (response to deficiencies, if any)

Date

Signature (revisions to submission, if any)

Date

Signature (final submission)

Date

An updated signature and form is required following any modification of the model and any revision of the original submission. If a signatory differs from the original signatory, provide the printed name and professional credentials for any new signatories. Additional signature lines shall be added as necessary with the following format:

Signature (revisions to submission)

Date

Note: A facsimile or any properly reproduced signature will be acceptable to meet this requirement.

Form G-3: Statistical Standards Expert Certification

I hereby certify that I have reviewed the current submission of FPHLM
(Name of Model)
Version 6.0 for compliance with the 2013 Standards adopted by the Florida Commission on Hurricane Loss Projection Methodology and hereby certify that:

1) The model meets the Statistical Standards (S1 – S6);
2) The disclosures and forms related to the Statistical Standards section are editorially and technically accurate, reliable, unbiased, and complete;
3) My review was completed in accordance with the professional standards and code of ethical conduct for my profession; and
4) In expressing my opinion I have not been influenced by any other party in order to bias or prejudice my opinion.

SNEH GULATI — Ph.D in STATISTICS
Name — Professional Credentials (area of expertise)

[signature] — 10/27/2014
Signature (original submission) — Date

[signature] — 12/22/2014
Signature (response to deficiencies, if any) — Date

Signature (revisions to submission, if any) — Date

Signature (final submission) — Date

An updated signature and form is required following any modification of the model and any revision of the original submission. If a signatory differs from the original signatory, provide the printed name and professional credentials for any new signatories. Additional signature lines shall be added as necessary with the following format:

Signature (revisions to submission) — Date

Note: A facsimile or any properly reproduced signature will be acceptable to meet this requirement.

99

Form G-6

Form G-6: Computer Standards Expert Certification

I hereby certify that I have reviewed the current submission of Florida Public Hurricane Loss Model
(Name of Model)

Version 6.0 for compliance with the 2013 Standards adopted by the Florida Commission on Hurricane Loss Projection Methodology and hereby certify that:

1) The model meets the Computer Standards (C1 – C7);
2) The disclosures and forms related to the Computer Standards section are editorially and technically accurate, reliable, unbiased, and complete;
3) My review was completed in accordance with the professional standards and code of ethical conduct for my profession; and
4) In expressing my opinion I have not been influenced by any other party in order to bias or prejudice my opinion.

Shu-Ching Chen	Computer Science
Name	Professional Credentials (area of expertise)
	10/22/2014
Signature (original submission)	Date
Signature (response to deficiencies, if any)	Date
Signature (revisions to submission, if any)	Date
Signature (final submission)	Date

An updated signature and form is required following any modification of the model and any revision of the original submission. If a signatory differs from the original signatory, provide the printed name and professional credentials for any new signatories. Additional signature lines shall be added as necessary with the following format:

Signature (revisions to submission)	Date

Note: A facsimile or any properly reproduced signature will be acceptable to meet this requirement.

Form G-6: Computer Standards Expert Certification

I hereby certify that I have reviewed the current submission of Florida Public Hurricane Loss Model
(Name of Model)

Version 6.0 for compliance with the 2013 Standards adopted by the Florida Commission on Hurricane Loss Projection Methodology and hereby certify that:

1) The model meets the Computer Standards (C1 – C7);
2) The disclosures and forms related to the Computer Standards section are editorially and technically accurate, reliable, unbiased, and complete;
3) My review was completed in accordance with the professional standards and code of ethical conduct for my profession; and
4) In expressing my opinion I have not been influenced by any other party in order to bias or prejudice my opinion.

Shu-Ching Chen	Ph.D. in Electrical and Computer Engineering & M.S. in Computer Science
Name	Professional Credentials (area of expertise)
	10/22/2014
Signature (original submission)	Date
	12/22/2014
Signature (response to deficiencies, if any)	Date
Signature (revisions to submission, if any)	Date
Signature (final submission)	Date

An updated signature and form is required following any modification of the model and any revision of the original submission. If a signatory differs from the original signatory, provide the printed name and professional credentials for any new signatories. Additional signature lines shall be added as necessary with the following format:

Signature (revisions to submission)	Date

Note: A facsimile or any properly reproduced signature will be acceptable to meet this requirement.

Form G-7: Editorial Certification

I/We hereby certify that I/we have reviewed the current submission of FPHLM
(Name of Model)
Version 6.0 for compliance with the "Process for Determining the Acceptability of a Computer Simulation Model" adopted by the Florida Commission on Hurricane Loss Projection Methodology in its *Report of Activities as of November 1, 2013*, and hereby certify that:

1) The model submission is in compliance with the Commission's Notification Requirements and General Standard G-5 (Editorial Compliance);
2) The disclosures and forms related to each standards section are editorially accurate and contain complete information and any changes that have been made to the submission during the review process have been reviewed for completeness, grammatical correctness, and typographical errors;
3) There are no incomplete responses, inaccurate citations, charts or graphs, or extraneous text or references;
4) The current version of the model submission has been reviewed for grammatical correctness, typographical errors, completeness, the exclusion of extraneous data/ information and is otherwise acceptable for publication; and
5) In expressing my/our opinion I/we have not been influenced by any other party in order to bias or prejudice my/our opinion.

Steven Cocke	Ph.D. Physics
Name	Professional Credentials (area of expertise)
	10/29/2014
Signature (original submission)	Date
Signature (response to deficiencies, if any)	Date
Signature (revisions to submission, if any)	Date
Signature (final submission)	Date

An updated signature and form is required following any modification of the model and any revision of the original submission. If a signatory differs from the original signatory, provide the printed name and professional credentials for any new signatories. Additional signature lines shall be added as necessary with the following format:

Signature (revisions to submission)	Date

Note: A facsimile or any properly reproduced signature will be acceptable to meet this requirement.

103

Form G-7: Editorial Certification

I/We hereby certify that I/we have reviewed the current submission of FPHLM (Name of Model) Version 6.0 for compliance with the "Process for Determining the Acceptability of a Computer Simulation Model" adopted by the Florida Commission on Hurricane Loss Projection Methodology in its *Report of Activities as of November 1, 2013*, and hereby certify that:

1) The model submission is in compliance with the Commission's Notification Requirements and General Standard G-5 (Editorial Compliance);
2) The disclosures and forms related to each standards section are editorially accurate and contain complete information and any changes that have been made to the submission during the review process have been reviewed for completeness, grammatical correctness, and typographical errors;
3) There are no incomplete responses, inaccurate citations, charts or graphs, or extraneous text or references;
4) The current version of the model submission has been reviewed for grammatical correctness, typographical errors, completeness, the exclusion of extraneous data/ information and is otherwise acceptable for publication; and
5) In expressing my/our opinion I/we have not been influenced by any other party in order to bias or prejudice my/our opinion.

Steven Cocke	Ph.D Physics
Name	Professional Credentials (area of expertise)
	10/29/2014
Signature (original submission)	Date
	1/5/2015
Signature (response to deficiencies, if any)	Date
Signature (revisions to submission, if any)	Date
Signature (final submission)	Date

An updated signature and form is required following any modification of the model and any revision of the original submission. If a signatory differs from the original signatory, provide the printed name and professional credentials for any new signatories. Additional signature lines shall be added as necessary with the following format:

Signature (revisions to submission)	Date

Note: A facsimile or any properly reproduced signature will be acceptable to meet this requirement.

103

Figure 27. Upstream fetch wind exposure photograph for Chatham, MA (left, looking north), and Panama City, FL (right, looking northeast). After Powell et al. (2004).

7. ***Provide the collection and publication dates of the land use and land cover data used in the model and justify their timeliness for Florida.***

We use the 2011 Multi-Resolution Land Characteristics Consortium (MRLC) National Land Cover Database released on March 31, 2014. This is a high-resolution (30 m) land cover dataset that covers not only Florida, but the entire United States, and roughly depicts land characteristics circa 2011 [see Jin et al. (2013) for more details]. We also use the Statewide 2004-2011 Florida Water Management District Land Use/Land Cover dataset based on 2004-2011 imagery. This dataset was published by the Florida Department of Environmental Protection on March 8, 2013.

8. ***Describe the methodology used to convert land use and land cover information into a spatial distribution of roughness coefficients in Florida and adjacent states.***

The land cover classifications provided by the MRLC Land Cover Database and the WMD land use/land cover data are first mapped to roughness values using a lookup table that associates a representative roughness for the land use category on the basis of peer-reviewed literature. An algorithm was developed to merge the datasets based on how well each dataset classified the land surface with respect to surface roughness. An effective roughness model (Axe, 2004) is then used to incorporate upstream roughness elements to provide a more realistic roughness on a 90 m (295 ft) grid covering Florida.

9. ***Demonstrate the consistency of the spatial distribution of model-generated winds with observed windfields for hurricanes affecting Florida. Describe and justify the appropriateness of the databases used in the windfield validations.***

As shown below in Disclosure 10 and in Statistical Standard 1, Disclosure 2, the spatial distribution of model-generated winds is consistent with observed wind fields for hurricanes affecting Florida. The observations are from the the H*Wind surface analyses produced by NOAA's Hurricane Research Division. These analyses are described in detail in Standard S-1, Disclosure 2. The H*wind analyses are highly regarded in the scientific community and have been cited in over 400 peer-reviewed publications.

10. ***Describe how the model's windfield is consistent with the inherent differences in windfields for such diverse hurricanes as Hurricane Charley (2004), Hurricane Jeanne (2004), and Hurricane Wilma (2005).***

The model can represent a wide variety of storms through variation of parameters for radius of maximum winds, central pressure deficit, and *Holland B*. Snapshots of model wind fields at landfall are compared to NOAA-AOML-HRD H*Wind analyses below (for further details see Disclosure 2 for Standard S-1). In these cases, rather than tuning the model to best fit the observations by varying the *Holland B* parameter, we derived the input *B* from the H*Wind analyses. Hurricane Charley, a small, fast moving 2004 hurricane (Figure 28, top), was modeled quite well; the motion asymmetry and extent of strong winds in the core of the storm were captured but the peak wind (near 150 mph) was underestimated by the model. Hurricane Jeanne Figure 28, bottom) struck the central Florida Atlantic coast in 2004. Similar to the observed (H*Wind) field, the modeled wind field maximum is on the right (north) side of the storm, but the model underestimates the peak wind of 105 mph and the area of winds above 70 mph. Wilma made landfall in Florida in 2005 as a very large hurricane (Figure 29). The FPHLM captures the location of maximum winds in the core of the storm and represents the left-right motion asymmetry, but tends to produce too broad of a wind field.

STATISTICAL STANDARDS

S-1 Modeled Results and Goodness-of-Fit

A. ***The use of historical data in developing the model shall be supported by rigorous methods published in currently accepted scientific literature.***

The historical data for the period 1900-2013 were modeled using scientifically accepted methods that have been published in accepted scientific literature.

B. ***Modeled and historical results shall reflect statistical agreement using currently accepted scientific and statistical methods for the academic disciplines appropriate for the various model components or characteristics.***

Modeled and historical results are in agreement as indicated by appropriate statistical and scientific tests. Some of these tests will be discussed below.

Disclosures

1. ***Identify the form of the probability distributions used for each function or variable, if applicable. Identify statistical techniques used for the estimates and the specific goodness-of-fit tests applied. Describe whether the p-values associated with the fitted distributions provide a reasonable agreement with the historical data. Provide a completed Form S-3, Distributions of Stochastic Hurricane Parameters. Provide a link to the location of the form here.***

Form S-3 at the end of this section identifies the form of the probability distribution used for each variable. Some of the methods and distributions are described below.

Historical initial conditions are used to provide the seed for storm genesis in the model. Small uniform random error terms are added to the historical starting positions, intensities and changes in storm motion. Subsequent storm motion and intensity are determined by randomly sampling empirical probability distribution functions derived from the HURDAT historical record.

Figure 39 shows the occurrence rate of both modeled and historical land-falling hurricanes in Florida. The figure shows a high level of agreement between historical and modeled occurrences. A chi-square goodness-of-fit test, for the number of years with 0, 1, and 2 or more hurricanes per year (4 bins each with 5 or more occurrences giving 3 degrees of freedom), gives a *p*-value of approximately 0.483. A comparison of landfalls by region and intensity is given in Form M1. The modeled results are consistent with the historical record, especially given the large uncertainty in the historical observations~~. Goodness of fit tests will be available for review~~.

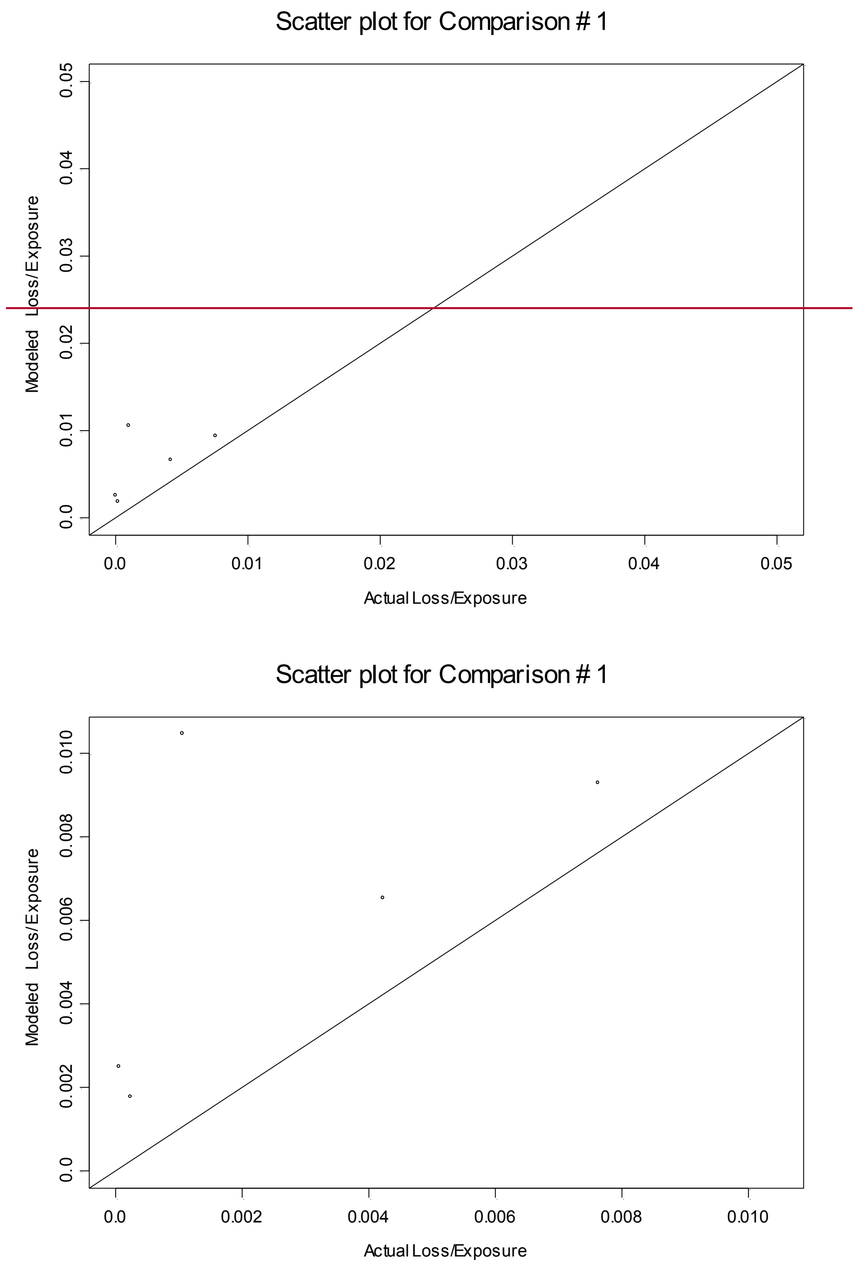


Figure 48. Scatter plot for comparison # 1.

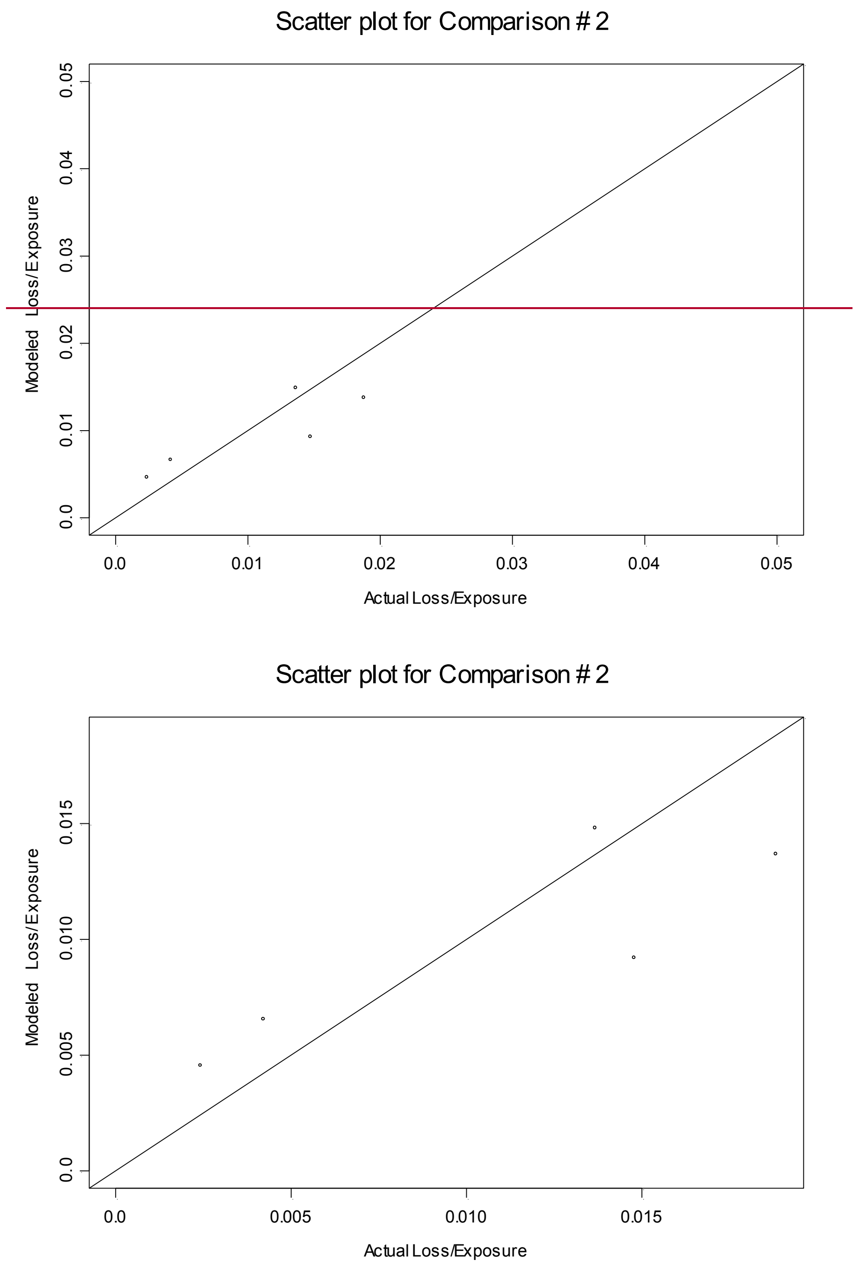
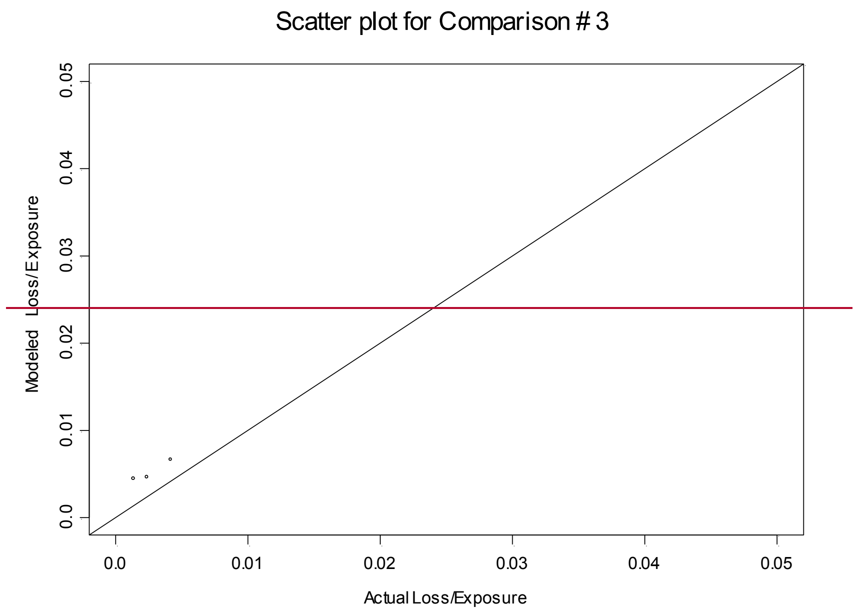


Figure 49. Scatter plot for comparison # 2.



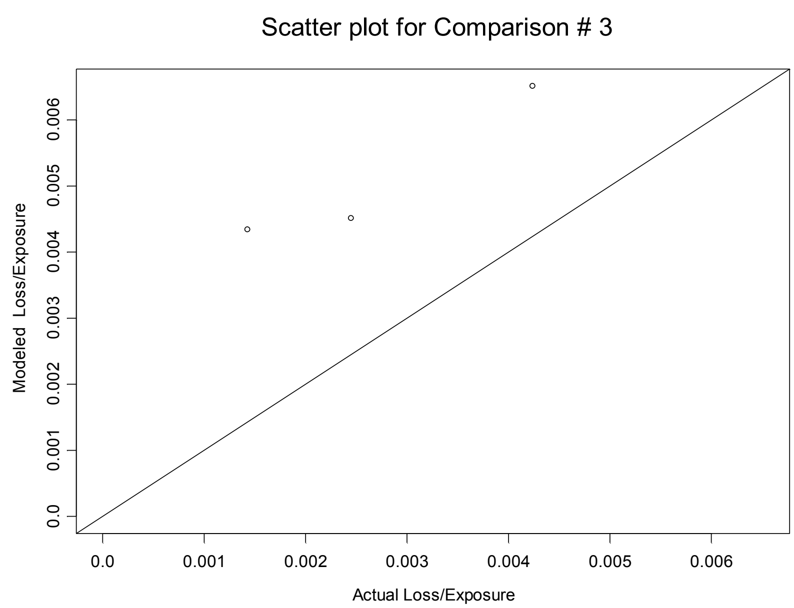


Figure 50. Scatter plot for comparison # 3.

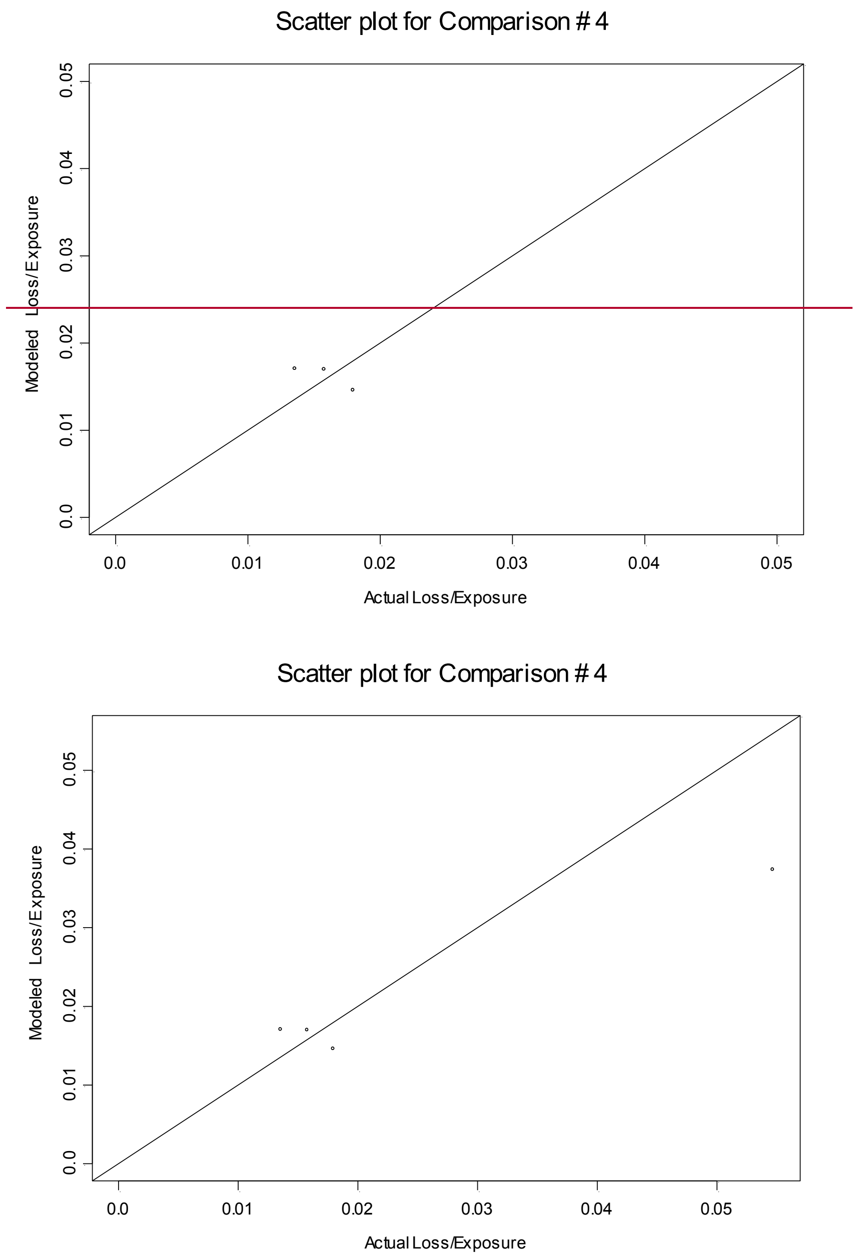


Figure 51. Scatter plot for comparison # 4.

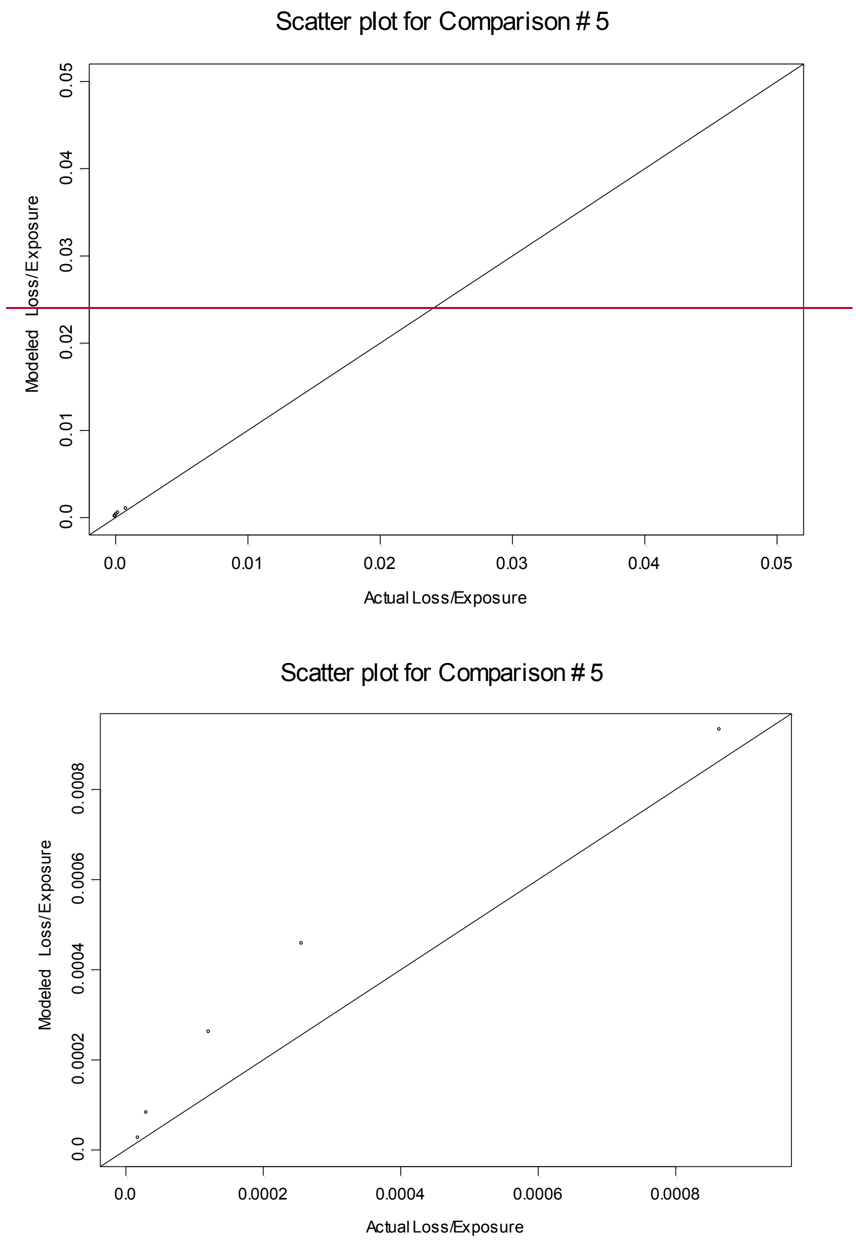


Figure 52. Scatter plot for comparison # 5.

Commercial Residential:

Comparison # 1: Company A and Q by Hurricane Jeanne, Katrina, and Wilma

Company	Event	Company Actual Loss/Exposure	Modeled Loss/Exposure	Difference
A	Jeanne	0.00716	0.01099	0.00384
A	Katrina	0.00183	0.00514	0.00332

A	Wilma	0.01555	0.00927	-0.00628
Q	Wilma	0.00375	0.00223	-0.00151

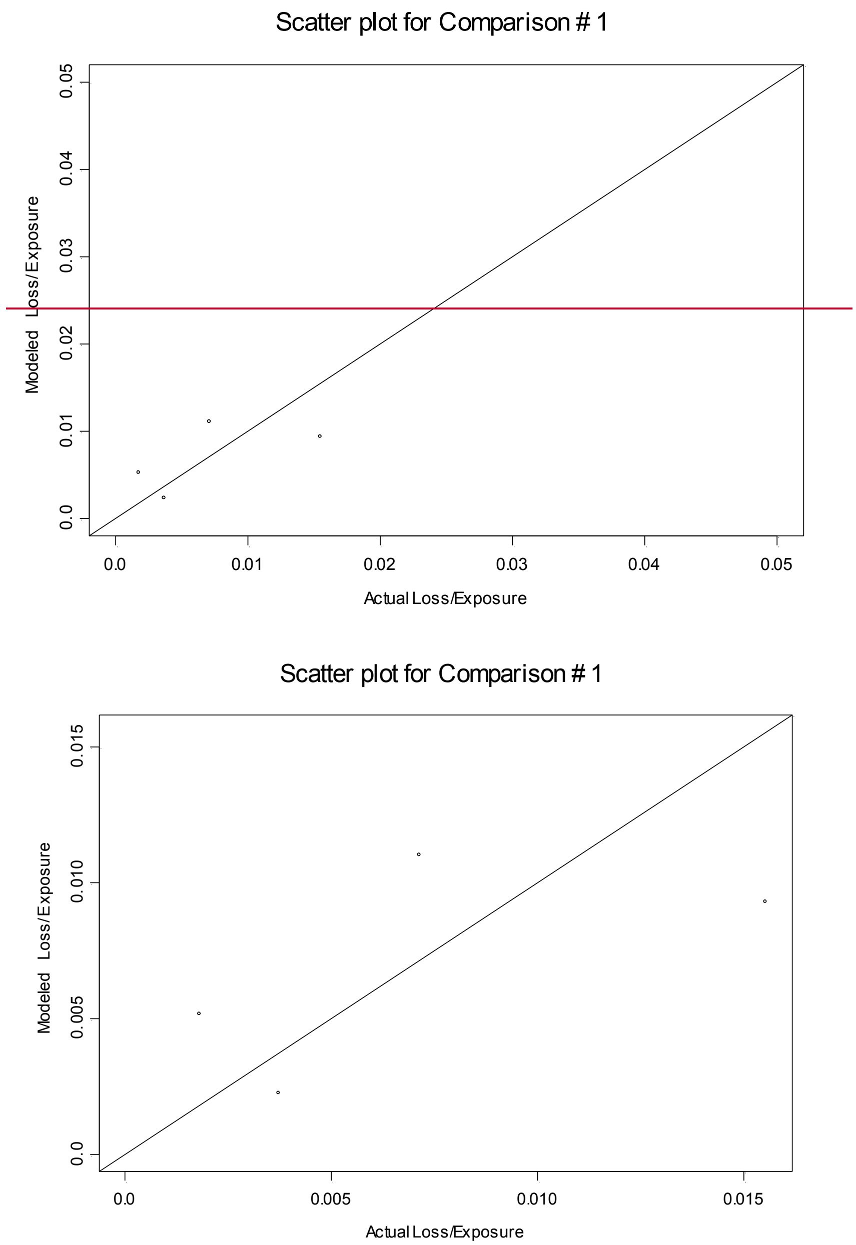


Figure 53. Scatter plot for comparison # 1.