The Paul C. Bell, Jr. Risk Management Program, and the Geographic Information Systems and Remote Sensing Research Center at Florida International University (FIU), with support from the U.S. Agency for International Development, Office of U.S. Foreign Disaster Assistance (USAID/OFDA), announce on-line training in disaster risk assessment modeling.

The training encompasses three modules: 1) *Digital Elevation Models* and *hydrological surface runoff* modeling in a GIS environment; 2) *Spatio-temporal precipitation* estimates derived from remotely sensed data; and 3) *Land cover / land use mapping* using remote sensing. The purpose of the modules is to establish data processing procedures to elevate data and extract spatially explicit information from raw data that can be applied in disaster risk modeling, including to the Central American Probabilistic Risk Assessment (CAPRA)[1], a modeling platform promoted by the World Bank, with support of CEPREDENAC[2], the Inter-American Development Bank (IDB), and the United Nations International Strategy for Disaster Reduction (UN-ISDR).

The training needs were established in coordination with the World Bank and the ERN Consortium, developer of the CAPRA Platform.

The training encompasses three modules:

1. *Digital Elevation Models (DEM)* and *hydrological surface runoff* modeling in a GIS environment

   The DEM and hydrological surface runoff modeling will cover aspects of DEM data sources and procedures to prepare raw data for hydrological surface runoff modeling. DEMs and basin boundary data layers are essential to run the models. These layers can be derived from different remotely sensed elevation data products, and the module includes guidelines on data source selection and processing steps. DEMs provide the topographic information of a region of interest and are used in flood, hurricane, landslide, and volcano hazard models at a coarse scale. The flood model in addition uses a detailed topography data layer of the area, for which the flood analysis is conducted. Therefore, discussions on the importance of resolution, precision, and scale associated to each data source and procedure are included. The training also includes guidelines to decision-making about what data sources and procedures are appropriate for the two different purposes. The non-hurricane rain event and flood hazard models also require a basin boundary file, which can be derived from a DEM using hydrological modeling tools in a GIS environment. The module includes discussions on processing steps to derive basin and watershed boundaries from DEMs.

[1] CAPRA is changing its name to Comprehensive Approach for Probabilistic Risk Assessment (CAPRA)
[2] Centro de Coordinación para la Prevención de los Desastres Naturales en América Central

2. *Spatio-temporal precipitation* estimates derived from remotely sensed data

   This module introduces methods of estimating precipitation derived from remotely sensed data and covers various aspects of spatially explicit meteorological data sets and their usefulness, in order to derive time-series precipitation estimates when dense networks of rain gauge stations are not available. Precipitation data associated with storm events are used in the non-hurricane rain events model by creating a relationship between the maximum precipitations, the area where the precipitation falls, the duration of the precipitation episode, and the frequency of the rainfall event. By analyzing this relationship, PADF curves are generated that can be used to determine the return time of precipitation events of specific magnitudes. The tutorial includes procedures for the extraction and formatting of precipitation estimates, so that they can be used to determine return times of events as well as in calibration and validation processes of hurricane precipitation models.

3. *Land cover / land use mapping* using remote sensing

   This third module estimates surface infiltration and evaporation conditions, land cover, and land use information. It is used to obtain runoff values, which indicate the quantity of water that will be absorbed or evaporated by the surface. The runoff factors map is used in the flood hazard modeling. Land use/land cover can be derived from various remotely sensed imagery using various classification methods and algorithms. Different classification and accuracy evaluation methods and procedures are discussed.

The modules provide alternative approaches and also guide the user in the decision-making process on choice of methods and potential data sources. For this purpose each module will include essential questions that need to be answered to evaluate suitability of alternative routes that can be pursued to derive the necessary information. A major identified challenge in hazard modeling is the concept of scales in relation to model appropriateness and respective data needs at each scale of interest.

On-line Training

The on-line modules are distributed and accessible through a web-portal. For this purpose, the GIS-RS Center designed a training program web-site with the following functionality. Participants will be given access to the portal to download training module materials and to upload completed assignments. The portal also has a support section for the exchange of information among course participants, as well as communication with GIS center personnel that provide technical support to participants. The modules are to be taken consecutively and successfully completed three months after the start date.

Software

Each of the training modules tutorial is designed for use with open source software. In some cases alternative procedures using proprietary software such as ArcGIS (ESRI)

are described as well. The list of open source software products includes the well-known GRASS GIS, and the statistical software R. For database use SQLite database browser is utilized to create and manage GIS data. Other tools and scripts that are utilized in the data processing and preparation process are stand-alone scripts written and executed in the python environment or stand-alone executables. All modules can be completed with those open source software packages and applications. Tutorials give a brief introduction to all required software and their installation procedures.

On-site Training

Upon successful completion of the on-line training modules the participants will be invited to a one-week workshop hosted at the GIS-RS Center teaching lab at FIU, Miami. During this workshop participants will have the opportunity to work on data sets implementing their acquired knowledge from the modules to a study area of their interest. Students reinforce their learning experiences by completing their proposed project in the technical lab and discussing processes and results with faculty, staff, and other students.

The purpose of the on-site training workshop is to introduce more advanced concepts of remote sensing and GIS, and to transfer theoretical knowledge acquired in the modules together with the data processing skills into projects that allow for efficient and high quality data products. The training will include not only more advanced theoretical concepts on remote sensing and GIS, but also integration in data processing workflows.

Selection Process

The Paul C. Bell, Jr. Risk Management program together with the GIS-RS Center will carefully select candidates to participate in the training series.

Requirements for Applicants

Minimum requirements:

1. Knowledge of intermediate statistics;
2. Formal course on GIS modeling, and/or remote sensing; and
3. Work related experience in teaching or applying GIS modeling and/or remote sensing.

Beneficial but not required:

- Background in hydrological modeling, climatology or disciplines related to earth or environmental sciences;
- Mathematics and statistics including, geometry, multivariate statistics, and linear algebra.

Candidates should submit:

1. Letter of application

2. Letter from the institution where the applicant works, indicating the importance of this activity for the individual and the organization.
3. Resume including demonstration of experience in GIS and/or Remote Sensing in the following 3 areas:

   Coursework
   - Formal coursework within an academic curriculum (indicate if at undergraduate or graduate level)
   - Workshops attended by software providers (certificates of attendance)

   Work experience
   - Project descriptions
   - Job assignments and workflows

   Teaching experience
   - Workshops
   - Academic courses
4. Two page proposal/project about a relevant area of interest to be implemented in his/her institution developed during the on-site training with direct relation to the thematic of the modules described here.

Application deadline: **April 22nd, 2011**

Selection notification: **May 6th, 2011**

On-line Training start date: **May 9th, 2011**

On-line Training end date: **August 5th, 2011**

On-site Training: **December 5-9, 2011**

Applications should be submitted electronically to Professor Juan Pablo Sarmiento, Latin American and Caribbean Center, Florida International University, Miami, Florida: **Juan-Pablo.Sarmiento@fiu.edu**.