

## **Preliminary Climate and Sea Level Changes for Vanuatu through the Application of SimCLIM for Vanuatu.**

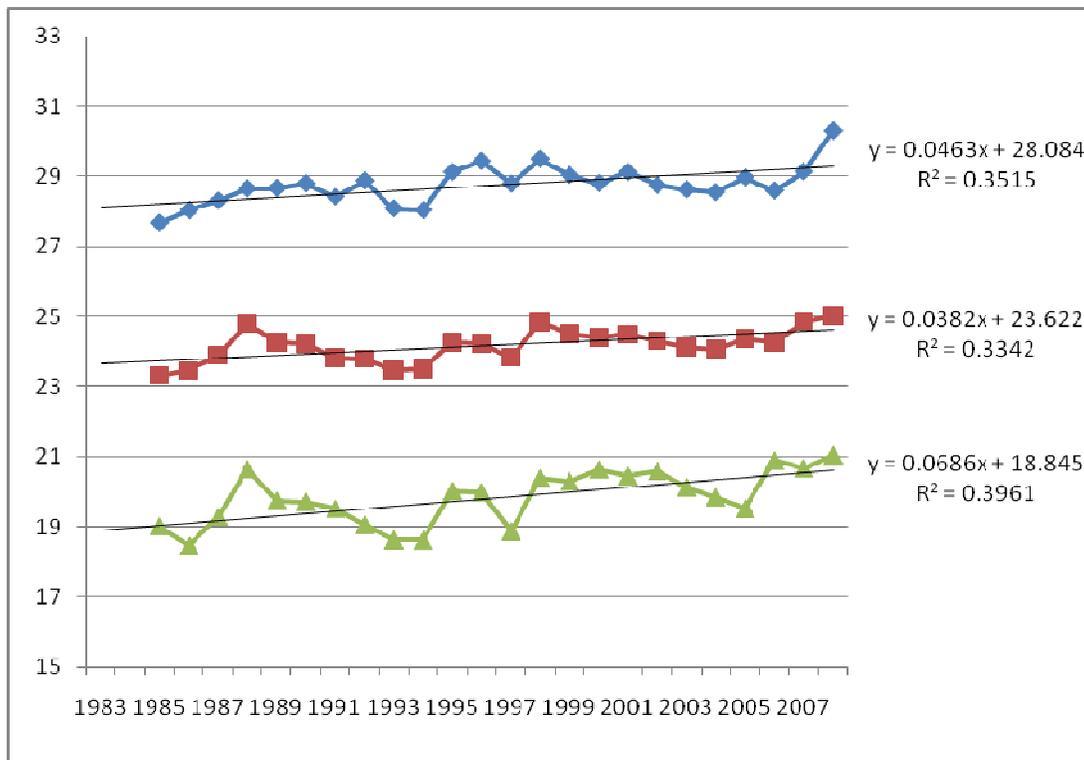
Port Vila, Vanuatu and Hamilton, New Zealand -- The Vanuatu National Advisory Committee on Climate Change (NACCC) through its Second National Communication (SNC) Project in collaboration with the Vanuatu Meteorological Services and CLIMsystems Ltd. of New Zealand have generated preliminary climate change and sea level rise results that will form the background for the country's SNC reporting to the United Nations Framework Convention on Climate Change (UNFCCC).

Last week the NACCC's SNC Project sponsored the third workshop in a series that has linked Vanuatu with CLIMsystems, the developer and service provider, for a customized version of SimCLIM called VanuaCLIM. The software has been tailored for use by Vanuatu with a local digital elevation model for all the islands of the Vanuatu archipelago and climate and other data specifically designed for application in the Pacific Island nation. The islands and their inhabitants are acknowledged as being on the front line in terms of the impacts of climate change. The combination of rising sea levels and exacerbated extreme events such as droughts and tropical cyclones are two of the more visible examples of global environmental change occurring across the region. Smaller, incremental changes in the underlying climate also impact on day-to-day activities such as farming, whereby weed invasions have occurred and disease outbreaks. Both can be linked to increasing temperatures and shifts in precipitation regimes that exceed very sensitive thresholds. Under the auspices of the UNFCCC and with funding from GEF through UNDP, Vanuatu and all the other nations of the Pacific are required to complete their Second National Communication. The document should express the underlying risk and vulnerability of the nation to climate change and define priority areas and adaptation activities so as to reduce the impacts of global environmental change.

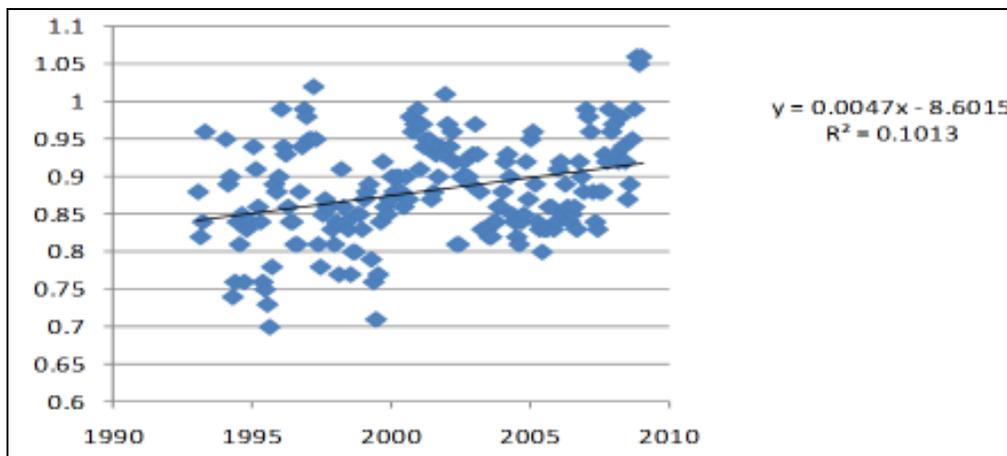
Vanuatu's NACCC, through its Meteorological Services, contracted CLIMsystems to provide not only a customised modeling system for the island nation but also technical backstopping in implementing its application. An enduring relationship has been formed and is based on excellent communication between the full membership of the NACCC which includes representatives from Meteorological Services, Agriculture, Water, Forestry, Fisheries, Quarantine, Lands, Tourism, Energy, and other specialist areas as required to complete the assessment. The third and most recent workshop saw the turning over of several new tools and training in various applications. One of the most helpful developments was a software tool for collating hundreds of individual Excel spreadsheet files of climate data developed through the Meteorological Service's data digitisation project. That project, which has been running for several months, has entailed the digitisation of the Service's extensive hardcopy climate data

record. Over 5,000,000 data entries have been made thus far and management of the records has greatly benefited from the application of CLIMsystems tools. The specialized data collation tool was used to draw together in one VanuaCLIM-compatible file, the daily precipitation and maximum, minimum and mean temperature for six sites spread across the archipelago. In 2010 more data will be brought into the VanuaCLIM system, such as relative humidity, wind and solar radiation and six hourly temperatures and the project progresses.

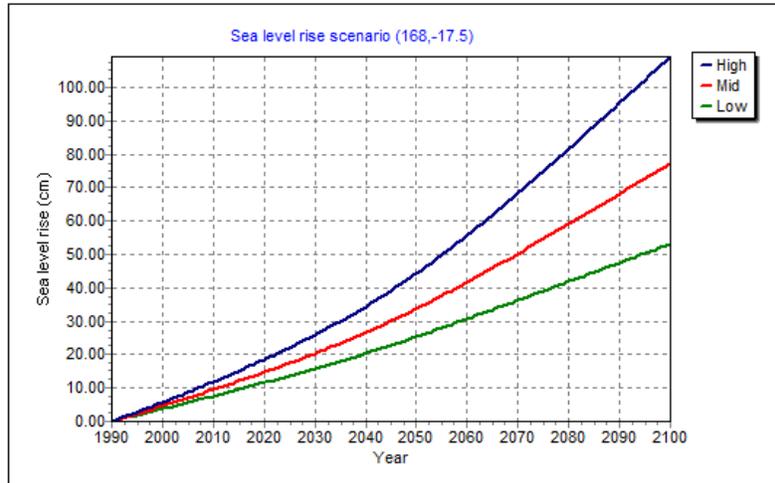
Using the newly digitised site-specific time series daily data a preliminary analysis was done on some of the major sites selected for field survey for the Second National Communication. For example, through analysis in VanuaCLIM and, by exporting processed data to Excel, we were quickly able to assess trends in minimum, maximum and mean temperature for Bauerfield, Efate situated near the capital Port Vila. While temperature on an annual basis is, of course, variable and reflects various cyclical climate phenomena that pertain to the Pacific, the general trend is toward a warming that is in line with global trends. While slightly slower in its overall temperature increase profile, as a result of the moderating effect of the surrounding Pacific ocean, maximum temperatures rose an average of 0.046 degrees Celsius, per year, over the period of record. Interestingly and, in line with global trends, the overnight minimum temperatures rose 70 percent quicker than the maximum, at 0.069 degrees Celcius, on average, per year.



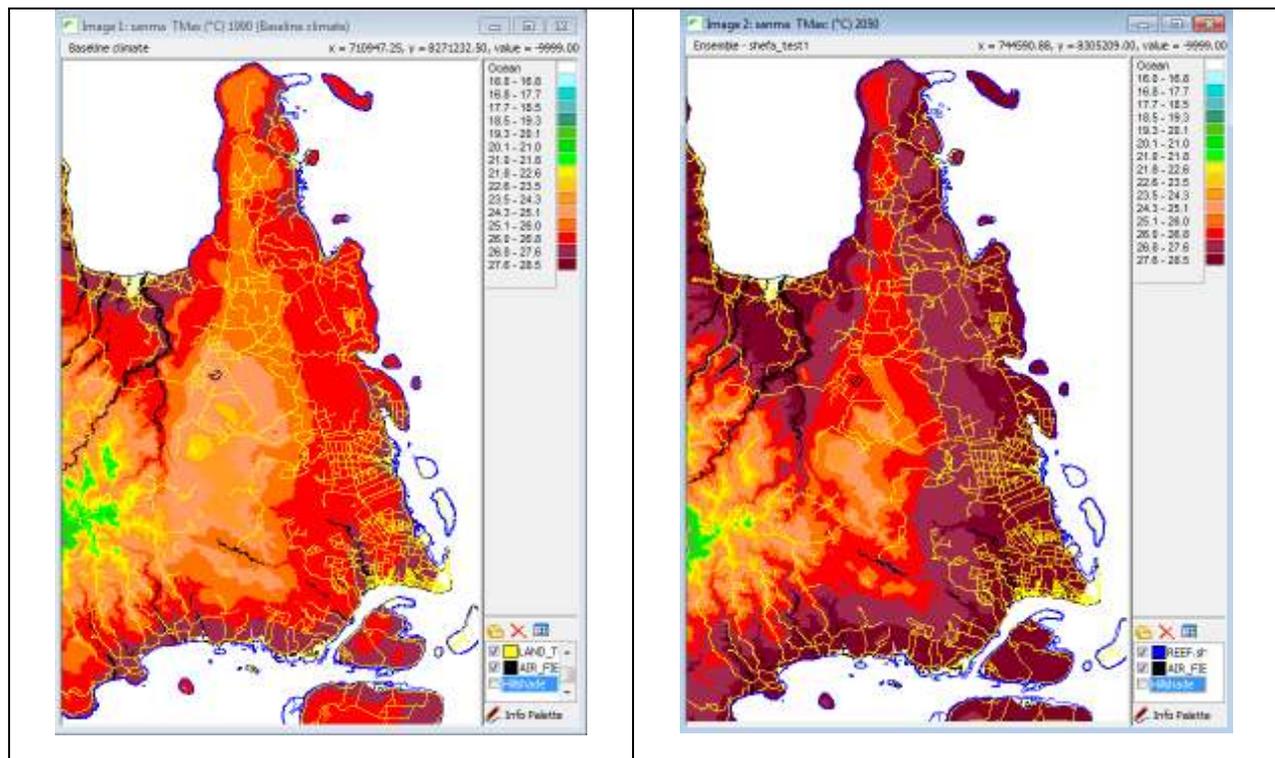
Another important analysis was for sea level rise conducted using VanuaCLIM and other software products developed by CLIMsystems. The VanuaCLIM sea level rise scenario generator is one of the more powerful climate impact assessment tools in that it considers local tidal trends and land movements, over time, in its computation of potential sea level rise scenarios. During the workshop Australia's National Tidal Center's holding of Port Vila data for the past 17 years was analysed for tidal extremes and trends using tools developed by CLIMsystems. The data was then entered into Excel so that a trend line could be constructed of the tidal change and vertical land movement. The derived figure of 4.738 mm a year was then entered into the VanuaCLIM sea level rise scenario generator.



A possible sea level rise scenario of 100 cms by 2100 for Port Vila was found when a high climate sensitivity was applied to a worse case story line for global greenhouse gas emissions within the global climate system. Globally the worse case from the Fourth Assessment Report of the Intergovernmental Panel on Climate Change is 59 cms. The portion of Efate island where Port Vila and the tide gauge are located is seismically active and, is in fact, slowly sinking, which exacerbates the real rate of sea level rise. It is important to note that this is just one scenario of possible sea level change and the data record is modest. The strength behind the VanuaCLIM modeling system is the ability to quickly and efficiently construct alternative scenarios based on different assumptions about the future. It is the range of possibilities and the uncertainty that they represent that can form the basis for a high quality risk and adaptation option assessment.



The Second National Communication team will be in the field in the first part of 2010 and plan to complete their document by the end of 2010. This will include their greenhouse gas inventory which is also underway. For more details on Vanuatu’s climate change initiatives, contact Brian Phillips, the Secretary of NACCC at the Vanuatu Climate Change Office [piccap@vanuatu.com.vu](mailto:piccap@vanuatu.com.vu).



Scenarios of baseline (1990) and maximum temperatures for Santo (2050) generated using the VanuaCLIM software.