Geophysical Research Abstracts
Vol. 15, EGU2013-14061, 2013
EGU General Assembly 2013

Assessing the Impacts of US Landfall Hurricanes in 2012 using Aerial Remote Sensing

John S. Bevington
ImageCat Ltd. Centrepoint House, 2 Denmark Road, Guildford, Surrey GU1 4DA UK (jb@imagecatinc.com)

Remote sensing has become a widely-used technology for assessing and evaluating the extent and severity of impacts of natural disasters worldwide. Optical and radar data collected by air- and space-borne sensors have supported humanitarian and economic decision-making for over a decade. Advances in image spatial resolution and pre-processing speeds have meant images with centimetre spatial resolution are now available for analysis within hours following severe disaster events. This paper offers a retrospective view on recent large-scale responses to two of the major storms from the 2012 Atlantic hurricane season: Hurricane Isaac and post-tropical cyclone ("superstorm") Sandy. Although weak on the Saffir-Simpson hurricane wind scale, these slow-moving storms produced intense rainfall and coastal storm surges in the order of several metres in the Louisiana and Mississippi Gulf Coast (Isaac), and the Atlantic Seaboard (Sandy) of the United States.

Data were generated for both events through interpretation of a combination of two types of aerial imagery: high spatial resolution optical imagery captured by fixed aerial sensors deployed by the National Oceanic and Atmospheric Administration (NOAA), and digital single lens reflex (DSLR) images captured by volunteers from the US Civil Air Patrol (CAP). Imagery for these events were collected over a period of days following the storms' landfall in the US, with availability of aerial data far outweighing the sub-metre satellite imagery. The imagery described were collected as vertical views (NOAA) and oblique views (CAP) over the whole affected coastal and major riverine areas. A network of over 150 remote sensing experts systematically and manually processed images through visual interpretation, culminating in hundreds of thousands of individual properties identified as damaged or destroyed by wind or surge.

A discussion is presented on the challenges of responding at such a fine level of spatial granularity for coastal tracts that ranged up to 750 km (Sandy), equivalent to the length of the coast of Portugal. Imagery clearly showed devastation to many communities in Louisiana and New Jersey with damage observable to individual structures. However, both events highlighted the ephemeral nature of flooding caused by storm surge. For example, in New York City, water quickly found its way to the lowest points, whether in the numerous transport tunnels, basements or construction sites. Impact assessment in these areas from imagery alone brought challenges for damage data development and modelled results were also cross-referenced during the quality assurance phase. The derived data resulting from these studies are invaluable for decision making at local and federal levels and for the insurance industry for use in emergency management, claims support and recovery planning.