NAME-1

SYNOPTIC FEATURES AFFECTING THE NAME TIER 1 REGION DURING SUMMER 2003

Maddox Robert
Dept. of Atmospheric Science, University of Arizona
Correo Electrónico: maddox@atmo.arizona.edu

The North American Monsoon season of summer 2003 is overviewed. Features of importance (large mesoscale to synoptic scale) that affected the NAME Tier 1 region, the area that will be the focus of enhanced observations to be taken during summer 2004, will be documented and discussed. So far, summer 2003 has been characterized by few Eastern Pacific tropical storms within or near the Tier 1 region, although the remnant circulation of Atlantic hurricane Claudette passed directly across the northern third of the Tier 1 region. Additionally, there have been no strong and clearly distinct surges, to date, of moisture northward up the Gulf of California. There have been several large MCS events over the northern half of Tier 1 and a substantial number of middle and upper-level cyclones and associated troughs have moved westward across northern Mexico. Particular emphasis will be given to discussing analyses of the very large upper cyclone of mid-August 2003 and associated convective weather events.

NAME-2

WEATHER EVENTS IN BAJA CALIFORNIA DURING THE WARM SEASON OF 2000

Farfan Luis M.
CICESE, La Paz, B.C.S.
Correo Electrónico: farfan@cicese.mx

Weather events that occurred during the period July-September, 2000 are investigated. Data from geostationary satellite and in-situ observations are used to determine characteristics of mesoscale convective systems over the Baja California Peninsula. It is found that these systems tend to occur over the higher-elevation terrain and reach maximum intensity in the late afternoon. When compared to systems that develop over the Sierra Madre Occidental mountains, the peninsular systems have a smaller horizontal scale, experience reduced horizontal motion, and last a few hours.

Among the convective systems identified from satellite imagery, there is a subset which is related to the passage of tropical cyclones south of the peninsula. A total of 4 named systems developed in the area and the effects of their approach are documented. In particular, the passage of hurricane Lane results in a disturbance with characteristics that resemble the events known as “gulf surges”. These characteristics include significant changes in the structure of wind, temperature and humidity near the surface as well as northward system propagation along the Gulf of California. High-resolution observations from the CNA/SMN network of automatic stations are used to document the disturbance evolution while moving over stations in the central gulf.

NAME-3

RECENT PACS-SONET OBSERVATIONS OF RELEVANCE TO NAME

Douglas Michael[1], Murillo Javier[2] y Mejia John[2]
[1] National Severe Storms Laboratory
Correo Electrónico: Michael.Douglas@noaa.gov
[2] CIMMS, University of Oklahoma

Starting in 1997, and expanding in the year 2000, special pilot balloon observations have been made in Mexico as part of the Pan American Climate Studies project. These observations, carried out by the Mexican Navy, have been made during the past 4 years at 6 sites along both Mexican coasts. Two of these sites fall within the Tier 1 domain of the planned North American Monsoon Experiment scheduled for the summer of 2004. These sites, located at the extreme north of the Gulf of California (Puerto Peñasco) and at Topolobampo, midway between the radiosonde sites of Empalme and Mazatlan, have provided additional information on the synoptic and diurnal variability of the low level flow along the Gulf. This presentation will describe the synoptic variability and mean flow at both sites during their period of record, as well as a comparison of the mean winds from these sites with the observations from nearby radiosonde sites.

In addition to the Gulf of California soundings, three other sites have operated around the Isthmus of Tehuantepec since 1997. These sites are useful in depicting the gap flow over the region and also the passage of tropical waves during the summer months. A description (“climatology”) of the characteristics of the gap flow during summer and winter months will be shown, as well as the mean structure of tropical waves that pass over the region during July and August. The feasibility of detecting these observations with the sounding data will be discussed.

NAME-4

CLIMATOLOGÍA DE ONDAS TROPICALES EN EL ATLÁNTICO, CARIBE Y MÉXICO (1948-2001)

Salinas Prieto José Antonio
Instituto Mexicano de Tecnología del Agua
Correo Electrónico: jsalinas@tlaloc.imta.mx

Dada la importancia de las ondas tropicales (OT) en la contribución de lluvias de verano en México, se realizó un estudio de la estructura espacial y temporal de estas perturbaciones observadas entre 1948 y 2001 en el Atlántico, Caribe y territorio mexicano. Los datos utilizados son de Reanálisis, producidos por NCEP (Centros Nacionales de Predicción del Medio Ambiente, por sus siglas en inglés), con una resolución espacial de 2.5° x 2.5° y temporal de 24 horas en las variables: viento, velocidad vertical, humedad específica, altura geopotencial y temperatura para el período de 1948 a 2001 en el nivel de 700 mb. La región de estudio se encuentra entre 5°N y 35°N y entre 0 y 120°W, abarcando el Atlántico tropical, Caribe y Pacífico del Este.

Para el período de estudio (mayo-noviembre de 1948 a 2001), utilizando filtros numéricos, diagramas Hovmöller, análisis de onduletas y estadística general, se estimó el número de ondas anuales, su variabilidad interanual, su intensificación-debilitamiento en el Caribe y estructura espectral desde África hasta el Pacífico del Este dándole seguimiento a su evolución al llegar al Caribe y México.

Se identificaron 2,490 OT que llegaron a México en 53 años, representando ello una incidencia promedio de 47 por año, este número es el 52% de las OT contabilizadas en la costa Atlántica de África, significando ello que aproximadamente la mitad de las perturbaciones que salen del continente africano llegan a México, de éstas perturbaciones 10 se intensifican anualmente en el Mar Caribe (21%) a costa de la transferencia energética de una Corriente en Chorro de bajos niveles (en 925 mb.), 21 se debilitan en ésta área (44%) y 14 mantienen su intensidad (29%).

La estructura espectral muestra que las perturbaciones entre 3 y 9 días son las más energéticas desde África hasta México, Perturbaciones entre 4 y 6 días de período se intensifican al oeste de 80°W, (Mar Caribe del oeste) entre junio-julio y en septiembre, siendo éstas las más energéticas en el Caribe y Sur-sureste de México. En el Pacífico del Este se pierde la esta estructura espectral al interactuar con la zona de convergencia intertropical y después de haber interaccionado con la orografía de Centroamérica y México.

Se concluye que las OT entre junio-julio y en septiembre de período 5 días son favorecidas por la transferencia energética del flujo medio (Corriente de niveles bajos). Entre mayo y noviembre las OT se debilitan en la parte central del Atlántico (entre 45°W y 65°W) sobre unja guía de ondas centrada en 17.5°N.

NAME-5

INFLUENCE OF TROPICAL INTRASEASONAL OSCILLATIONS ON THE NORTH AMERICAN MONSOON

Mo Kingtse y Schemm Jae
Climate Prediction Center, NCEP, NWS, NOAA
Correo Electrónico: kingtse.mo@noaa.gov

Linkages between tropical intraseasonal oscillations and precipitation anomalies over North America are examined for June-September from 1979 to 2002. The outgoing long wave radiation anomalies (OLRAs) and 200 hPa streamfunction anomalies are filtered to focus on the time scales from 10 to90 days. The composite results shows that summer precipitation anomalies are modulated by the Madden Julian Oscillation (MJO) and a submonthly oscillation on the 22-28 days time scale.

When enhanced convection associated with the MJO extends from the central Pacific to the eastern Pacific, Central America and southern Mexico are likely to be dry. Over the United States, rainfall anomalies exhibit a dipole with wet conditions over the southern Great Plains and dryness over the Southeast.

In addition to the MJO, summer precipitation over North America is also regulated by a submonthly oscillation in the 22-28 day range. The OLRA composite based on this mode shows a four cell pattern with two dipoles opposite in phase straddling the Equator with centers at 120 ºE and 150 ºE. The time-space evolution shows westward propagation of OLRA from the western Pacific at 150 ºE to the South China Sea, while OLRAs in the Indian Ocean propagate northward to the Indian continent.

In the intraseasonal band, the MJO and the submonthly mode act together to modulate summer precipitation over the United States. Largest impact occurs when positive OLRAs are located in the South China Sea and negative OLRAs are located over the western Pacific centered at 120E. The associated rainfall anomalies over the United States exhibit a phase reversal pattern between the Southwest and the central United States, which is the leading precipitation regime over the United States.

30 day forecasts were performed each day from June-September 1998 to 2002. The forecast skill is lowest for the forecasts in 2002 because of strong intraseasonal oscillations. The model tends to underestimate the strength of convection. Therefore, forecast skill is higher when convection over the western Pacific is suppressed. The forecast skill will be analyzed according to precipitation regimes associated with summer monsoon.

NAME-6

MONITORING PROCESS AND SCALE INTERACTIONS IN THE SIERRA NEVADA OCCIDENTAL DURING THE NORTH AMERICAN MONSOON

Barros Ana P.[1] y Watts Christopher[2]
[1] Division of Engineering and Applied Sciences, Harvard University
Correo Electrónico: barros@deas.harvard.edu
[2] CIDESON, Mexico

In mountainous regions, there is a strong coupling between the space-time variability of rainfall and landform on the one hand, and between the space-time variability of rainfall and the surface water and energy budgets modulated by landform and vegetation on the other. Previous studies have shown that orographic land-atmosphere interactions explain most of the variability of monsoon hydrology from the diurnal cycle of rainfall to the seasonal cycle of subsurface and streamflow response in other regions of the tropics, and the Himalayan range in particular. However, the geology, climate, ecology, spatial organization and layout of the Sierra Nevada, as well as its relative orientation with regard to the prevailing monsoon circulations are very different from those of the Himalayas, especially along the continental divide. In this context, we propose a field experiment aimed at characterizing the hydrometeorology of headwater catchments in the Sierra Madre Occidental, Sonora Region, and at understanding the evolution of monsoon systems in response to changes in vegetation and topography. For this purpose, we plan to install a multi-level monitoring network of hydrometeorological towers, raingauges, soil moisture and vegetation sampling sites, and stream gauge locations embedded within other observational sites set up in the context of NAME (North American Monsoon Experiment) and the Soil Moisture Experiment SMEX04-NAME during the 2004 monsoon, with a view to close the water budget at the river basin scale. A tethersonde system will be deployed to monitor conditions in the lower troposphere. In this paper, we present our observational plans and strategy vis-a-vis diagnostic simulations of monsoon systems in the Sierra Nevada Occidental using a cloud-resolving model.

NAME-7

PALEOREGISTROS DEL MONZÓN MEXICANO Y TORMENTAS TROPICALES EN EL BAJO GOLFO DE CALIFORNIA: EL ÚLTIMO MILENIO

Herguera Garcia Juan Carlos[1], Molina Cruz Adolfo[2] y Bernal Franco Gladys[3]
[1] CICESE
Correo Electrónico: herguera@cicese.mx
[2] ICMYL, UNAM
[3] Escuela de Geociencias y Medio Ambiente, Universidad Nacional de Colombia, Medellín, Colombia

Situado en el límite entre el trópico y el subtrópico el clima del extremo meridional de la Península de Baja California oscila estacionalmente entre un período seco y otro húmedo que coinciden con el invierno y el verano boreales y reflejan el patrón tropical de lluvias que afecta a la mayor parte del territorio en México. El período de mayor insolación en el trópico precede al de mayor precipitación asociado con el máximo calentamiento de las aguas del Pacífico tropical nororiental, a la migración meridional de la zona de convergencia intertropical, a la evolución del monzón Mexicano y al pasaje de los ciclones tropicales. La precipitación en el margen meridional de la Península de Baja California, situado en el límite de influencia con respecto los tres primeros procesos, se encuentra fuertemente influenciada por uno de los fenómenos mas espectaculares asociados al calentamiento de las aguas del trópico durante finales de verano, el arribo de los ciclones tropicales. La mayoría de los eventos de mayor volumen de precipitación se encuentran invariablemente asociados al paso de una tormenta tropical por la región. Estos eventos extraordinarios y abruptos poseen una gran capacidad de erosión, carga y transporte a la costa y plataforma continentales de materiales terrígenos que alimentan de sedimentos de origen continental las cuencas costeras a orillas del Golfo de California. El análisis de estos registros nos revelan la modulación que introducen las tormentas tropicales en la formación de los sedimentos laminados que se acumulan en el fondo de estas cuencas al tiempo que nos proporcionan de un índice de paleotormentas para esta región, cuyas implicaciones climáticas discutiremos en términos de la evolución temporal de las temperaturas del mar del Pacífico Norte y del monzón Mexicano.

NAME-8

DYNAMIC MECHANISMS OF THE GULF SURGE

Zehnder Joe
Arizona State University
Correo Electrónico: zehnder@asu.edu

Surges of moisture from the Gulf of California are a phenomenon associated with the North American Monsoon that transport moisture into the deserts of western and central Arizona. This phenomenon has been acknowledged operationally and by researchers for over thirty years. The surge is typically linked to the presence of some sort of low-pressure system such as an easterly wave, mesoscale convective system or hurricane located near the southern end of the Gulf of California. Proposed mechanisms for the gulf surge are gravity currents, ageostropic flows, Kelvin or Rossby edge waves. In this talk, I will describe the fundamental dynamics of each of these mechanisms and assess their plausibility through scale analyses and idealized numerical simulations, and to suggest signatures that may appear in data and output of more sophisticated numerical models.

NAME-9

STUDY OF GULF SURGES USING QUIKSCAT DATA

Johnson Richard H., Ciesielski Paul E. y McNoldy Brian D.
Colorado State University
Correo Electrónico: johnson@atmos.colostate.edu

Preliminary analysis of data from NASA's Quick Scatterometer (QuikSCAT) for three years (2000-2002) reveals that periodic southerly surges are detectable in the surface wind field over the Gulf of California during the North American summer monsoon. QuikSCAT provides measurements (starting in mid-July 1999) of wind speed between 3 to 20 m/s in non-raining, oceanic areas with an accuracy of 2 m/s in speed and 20 degrees in direction. Its sun-synchronous orbit and 1,800 km swath provide data coverage 1 to 2 times per day with a horizontal resolution of 25 km. Since the width of the Gulf of California ranges from 150 to 300 km, this resolution allows for a number of data points to fall within the span of the Gulf. The geophysical product retrieved from QuikSCAT observations is the equivalent of neutral winds at 10-m height.

For the three years studied so far, QuikSCAT data indicate that surges occur at 5-7 day intervals and vary in strength and duration somewhat from year to year. Acceleration of the southerly flow typically begins near the mouth of the Gulf, except for surges associated with hurricane passages when southerly acceleration extends much farther to the south. Surface wind speeds in the strongest surges are up to 10 m/s and the typical propagation speeds up the Gulf are 5 to 10 m/s.

During surge events, northwesterly surface flow is often found extending around the southern tip of Baja California and bifurcating, with one branch flowing up the Gulf and another toward the southeast. SST data indicate that a potential source for cool air into Gulf surges, in addition to that associated with convective outflows over the southern Gulf, is from flow across the strong SST gradient near the southern tip of Baja separating the cool eastern Pacific Ocean from the warm Gulf waters.

NAME-10

UNA PROPUESTA METODOLÓGICA PARA ANALIZAR EL EFECTO DE VIENTOS MONZÓNICOS EN LOS NIVELES DE PRECIPITACIÓN OBSERVADOS EN EL LITORAL DEL PACÍFICO SUR DE MÉXICO DURANTE EL AÑO 2000

Sánchez Gómez Rubén[1], Meulenert Peña Ángel R.[2] y Acosta Gurrola Mireya[2]
[1] Depto. de Matemáticas, CUCEI, Universidad de Guadalajara
Correo Electrónico: rsanchez@ccip.udg.mx
[2] Depto. de Física, CUCEI, Universidad de Guadalajara

La estación de lluvias en la región litoral del Pacífico sur de México, parece estar asociada con la circulación anticilónica que se presenta sobre el pacífico oriental y acompañado de vientos del noreste (Cortez, 2000), conduce a vientos del hemisferio sur que llegan a penetrar hasta las costas de México y América Central, marcando una circulación tipo "monzónica". De hecho, Ramage Webster (1998), establece dos criterios fundamentales para definir un sistema tipo monzón como la "inversión de la dirección del viento" y la "ocurrencia de precipitación estacional", estableciendo que la región de América Central califica como sistema monzónico al menos en términos de precipitación.

En particular, en este trabajo se presenta un estudio de los vientos tipo monzónicos que penetran la costa sur de México y su relación con la precipitación en esta zona. Se aplica el modelo de regresión logística para medir este efecto, incluyendo la variabilidad atribuida a la temperatura media de la superficie del mar y humedad relativa observada en las estaciones meteorológicas disponibles en la zona de interés.

NAME-11

RESULTS FROM THE ENHANCED NAME RAIN GAUGE NETWORK: JULY 2002 - MAY 2003

Watts Christopher[1], Jimenez Lagunes Alejandro[2], Gochis David[3], Leal Lupercio Juan Carlos[2], Garatuza Payán Jaime[4], Shuttleworth W. James[5], Uribe Alcántara Edgar Misael[5], Eastoe Christopher[5] y Wright William[6]

[1] Universidad de Sonora
Correo Electrónico: watts@fisica.uson.mx
[2] IMADES
[3] National Center for Atmospheric Research
[4] Instituto Tecnológico de Sonora
[5] University of Arizona
[6] Columbia University

In July 2002, fifty tipping-bucket recording rain gauges were installed in NW Mexico in an area between 25N-30N and 106W-111W. This network provides information about the timing and intensiity of rainfall events which is not available from the network of climatological stations operated by the National Water Comission (CNA), where daily precipitation totals are measured. Sites were chosen to improve the sampling of the topography of the region. Results from the 2002 monsoon season which were lumped into 500m elevation bands showed that the number of rainy days increased with elevation, but that the (daily)rainfall intensity was highest in the lowest elevation band (0-500m). In this study we present a more detailed analysis of the relationship between elevation and rainfall intensity. We also include results from the cross-calibration for 14 sites wHere tipping-bucket rain gauges were installed alongside the manual gauges at CNA stations.

Twelve water sample collectors were also installed in the network to allow the analysis of oxygen and hydrogen isotopes. Separate sample were collected and analysed for the monsoon season and the following winter.

NAME-12

EPPREPMEX, AN OPERATIONALLY RAINFALL ESTIMATION SYSTEM FOR MEXICO (AND NAME?)

Sanchez Sesma Jorge
Instituto Mexicano de Tecnología del Agua
Correo Electrónico: jsanchez@tlaloc.imta.imx

The occurrence of tropical cyclones, tropical waves and mesoescale convective systems located in the NAME area are the cause of considerable damage to life and property in coastal areas of NW Mexico and SW US. These meteorological systems show intensive rainfall that produce frequent damage with floods in extensive areas. As an example, in this year the tropical cyclone Ignacio produced extended rainfall over Sierras de Baja California Sur, that created water runoffs that, helped by terrain conditions, produced extensive flash-floods with the lost of lives and properties. In order to reduce this damage in lives and properties, and to better understand the monsoon convective processes it is required an operationally remote sensor monitoring system of rainfall fields.

In 1991, IMTA at Cuernavaca, Mexico initiated a research program aimed at providing monitoring of rainfall by remote sensing systems. An adaptation of the technique proposed by Adler and Negri, 1988, was developed for the continuous estimation of tropical cyclone rainfall using GOES-IR satellite imagery, Sánchez-Sesma and Sosa (1993). The system was tested experimentally for operational activities in the Mexican Weather Service Office (SMN), along summer season of 1992 and 1993. A calibration procedure for the Mexican territory was developed in 1996 in order to obtain an improvement and refinement of the system for summer rainfall. Since 1997 the system was installed for operational use in the offices of the SMN at Tacubaya, Mexico City, (Sánchez-sesma and Sosa, 2003). In 2001 and 2002 an estimation of rainfall based on satellites and radar imagery has been developed and tested.

The EPPrePMex system will give elements to improve the manage of the rainfall data with confirming trends and interpolating in areas with scarce information caused by few density in the meteorological network or by delays in the monitored data transmission. This kind of systems give operational complementary information of rainfall both for developed and developing countries. Only by joining and adding the capabilities of the different monitoring systems we could improve our knowledge of the atmosphere for meteorological and climatological purposes.

The present paper has as goal the discussion of the theory and practice of the rainfall estimation, implemented in EPPrePMex for the NW Mexico and SW US. Specifically a comparison of the gage and estimated values for daily accumulated rainfalls, before and after bias correction is done. Finally an analysis of the potential contribution of this system to the operational and research purposes of NAME are commented.

NAME-13

THE ROLE OF OCEANIC PROCESSES ON GULF OF CALIFORNIA SST EVOLUTION DURING NAME: A PROJECT PROPOSAL

Lavín M.F.[1], Mascarenhas Affonso[2], Douglas Michael[3], Beier Emilio[1], Castro Valdez Rubén[4], Mitchell David[5], Guest Peter[6], Gómez Valdés José[1] y Ivanova Dorothea[5]

[1] CICESE
Correo Electrónico: mlavin@cicese.mx
[2] Instituto de Investigaciones Oceanologicas, UABC
[3] National Severe Storms Laboratory, Norman, OK, USA
[4] Facultad de Ciencias Marinas, UABC
[5] Desert Research Institute, Reno, Nevada, USA
[6] Naval Postgraduate School, Monterey, California, USA

Our proposal for oceanographic and at-sea atmospheric observations during the North American Monsson Experiment (NAME) is described. The project focuses on questions related to the relative importance of oceanic heat advection and local air-sea fluxes in controlling the SST evolution during the NAM in the Gulf of California. The general objective of the proposed work is to advance in the understanding of the processes that control the evolution of SST in the Gulf of California, and therefore of the air-sea fluxes of heat and moisture during late-spring and summer. This will be achieved by means of direct observations of the spatial structure and

time evolution of: (a) the hydrography and the system of currents in the upper layers of the southern gulf, and (b) the marine layer and the lower atmosphere over the southern part of the gulf. In addition, outputs of "imported" 3D GCM models will be analyzed for the zone as an additional tool in understanding the dynamics of the ocean circulation and its effect on the SST. The proposed observational effort consists of two 15-day oceanographic cruises, in which data will be collected on: (a) oceanic currents and thermohaline structure (CTD, ADCP, drifters), and (b) surface and upper air meteorological observations (radio sonde and pilot baloon soundings). In addition, coastal meteorological stations and moored profiling current meters will be maintained on the two sides of the GC entrance.

NAME-14

RELATIONSHIP BETWEEN ANTECEDENT LAND SURFACE CONDITIONS AND PRECIPITATION IN THE NORTH AMERICAN MONSOON REGION

Zhu Chunmei[1], Lettenmaier Dennis[1] y Cavazos Tereza[2]
[1] University of Washington
Correo Electrónico: chunmei@hydro.washington.edu
[2] CICESE

We explore possible links between North American Monsoon System (NAMS) seasonal (Jun-Jul-Aug-Sep) precipitation and pre-monsoon (previous autumn, winter, and spring) land surface conditions, including precipitation, temperature, soil moisture and snow cover, anomalies. We hypothesize land and sea surface feedback mechanisms associated with NAMS precipitation, and we propose an approach for determining their dynamical links. Following previous investigators, we partitioned the NAMS region into four sub-regions (Monsoon West, South, North and East) based on the seasonality and variability of JJAS monsoon precipitation from 1961-1990, and evaluated the possible effects of previous land surface conditions in various subcontinental "predictor regions" on Monsoon West (MW) monsoon precipitation. MW includes parts of eastern Arizona and western New Mexico. Data for the study were monthly aggregates from the retrospective Land Data Assimilation System (LDAS) archive for the period 1950 to 1999. The retrospective LDAS archive includes gridded precipitation (P), mean surface air temperature (Ts), and Variable Infiltration Capacity (VIC) land surface model-derived soil moisture (Sm), and snow water equivalent (SWE). Our preliminary results indicate that land surface-monsoon relationships are not stable in time, as has suggested by past studies. For instance, we found a statistically significant negative relationship between winter (JFM) precipitation in the Southwest U.S. predictor region which includes southern California, Nevada, Utah, Arizona, western Colorado and New Mexico, and MW monsoon rainfall during the 1965-1990 period, but weak relationships for other periods. We also found negative correlations between MW precipitation and winter-spring SWE in a predictor region that included the mountainous portions of Utah and Nevada. These relationships were especially strong between 1965 and the late 1980s. Based on the concept that the onset of the NAM is dynamically induced by land-sea temperature contrasts, we hypothesize that more winter P leads to more winter and early spring SWE in the predictor area, hence more spring and early summer Sm, and lower spring and early summer Ts, which induces a weaker onset of the NAMS and vice versa. We found that the antecedent land surface link that we propose (SWE, Sm, and Ts) is stronger in the Utah and Nevada mountain source areas where SWE may play a significant role in underpinning the land surface memory effect into the atmosphere. We outline future work that will construct an exploratory seasonal monsoon precipitation predictive model based on antecedent conditions.

NAME-15

SENSIBILIDAD DE MODELOS DE MESOESCALA A ESQUEMAS DINÁMICOS DE COBERTURA VEGETAL

Lobato Sánchez René, Rodríguez López Olivia y Mendoza Uribe Indalecio
Instituto Mexicano de Tecnología del Agua
Correo Electrónico: rlobato@tlaloc.imta.mx

Se presenta una evaluación del modelo de mesoescala MM5 acoplado con el modelo ACASA (Advanced Coupled Atmosphere-Surface Algorithm) que responde dinámicamente a las interacciones de la superficie terrestre, con ello se muestra que la actividad suelo-cobertura vegetal tiene un papel importante en el desarrollo de los sistemas locales y regionales de circulación atmosféricos, como resultado la precipitación pluvial asociada puede ser inhibida o aumentada, dependiendo de la actividad dinámica en los niveles bajos de la atmósfera. Si bien es cierto que los campos meteorológicos de escalas mayores son importantes pues éstos transportan la humedad desde los océanos, de la misma manera la importancia de los procesos locales y regionales por el transporte vertical con la ayuda del forzamiento orográfico, incrementando así el proceso convectivo. Por lo tanto, el problema radica en si los modelos dinámicos de suelo-cobertura vegetal acoplados a modelos atmosféricos contribuyen a una mejor representación de los patrones de lluvia. Para este fin, es necesario contar con información de superficie (humedad y tipo de suelo, cobertura vegetal) actualizados, puesto que año con año se aprecia a través de los inventarios forestales, el decremento de densidad de biomasa en el NW de México

Los resultados muestran que el esquema es mejor en cuanto a la representación de los flujos de humedad y calor sensible y latente (Pyles et al, 2001) comparados con un modelo estadístico, y en el ejemplo de aplicación, que comprende esta presentación, para la región NW de México se aprecia que los campos de lluvia dependen del tipo de cobertura vegetal.

NAME-16 CARTEL

VARIABILITY OF PRECIPITABLE WATER OVER SOUTHERN ARIZONA AND SONORADURING THE SUMMERTIME MONSOON SEASON: CONTRASTS BETWEEN 2002 AND 2003

Minjarez Sosa Carlos, Hahmann Andrea y Kursinski Rob
University of Arizona
Correo Electrónico: minjarez@atmo.arizona.edu

In collaboration with research and educational institutions in the USA and Mexico we have installed an array of Global Positioning System (GPS) receivers to monitor precipitable water vapor (PWV) in Arizona and northern Mexico during the monsoon season. This network is part of SuomiNet; a university-based, real-time, international GPS Network for atmospheric and geodetic research and education sponsored by the USA National Science Foundation.

Just before the onset of the 2002 monsoon season, we installed the first two sites, one at the University of Arizona campus in Tucson and the other at the Cochise College campus in Douglas in

southeastern Arizona. During 2003, we have added four more sites: one in Phoenix (sponsored by the Salt River Project), one on Mount Hopkins (located 60 km south of Tucson in the Santa Rita Mountains), on in Puerto Penasco at the northern edge of the Gulf of California in Sonora, Mexico, and the last one the Central Campus of the Universidad de Sonora (sponsored by the Universidad de Sonora), in Hermosillo Sonora,Mexico.

We have compared the GPS-derived estimates of PWV with those derived from radiosonde and the GOES sounder, three different methods that yield an independent and robust cross check. The analysis of these estimates using time series, scatter plots, and histogram comparisons have revealed excellent overall agreement as well as some systematic biases.

Our sites captured the onset of the monsoon during 2002 and 2003, and reveal interesting low and high frequency temporal variability. Using data from 2002, we separated the GPS PWV measurements into four distinct periods: pre-monsoon, monsoon, post-monsoon and winter seasons. The frequency distribution of PWV values in these four periods indicates that the atmosphere tends to prefer either low PWV or high PWV values. Also it is interesting to note that PWV values near 22 mm seldom occur during transitions between higher and lower values.

For this presentation we will compare the data from the two years of observations available for Tucson and Douglas, and investigate if our previous conclusions still hold for the monsoon season of 2003. In addition, similar analysis to that done during 2002 will be performed for the rest of our sites. The proposed expansion of the network into Mexico for the upcoming North American Monsoon Experiment (NAME) will also be discussed.