

**Record 1 of 21**

**Author(s):** Garcia-Selles, C (Garcia-Selles, Carles); Pena, JC (Carlos Pena, Juan); Marti, G (Marti, Gloria); Oller, P (Oller, Pere); Martinez, P (Martinez, Pere)

**Title:** WeMOI and NAOi influence on major avalanche activity in the Eastern Pyrenees

**Source:** COLD REGIONS SCIENCE AND TECHNOLOGY, 64 (2): 137-145 Sp. Iss. SI NOV 2010

**Conference Title:** International Snow Science Workshop

**Conference Date:** SEP 27-OCT 02, 2009

**Conference Location:** Davos, SWITZERLAND

**Abstract:** Major avalanche episodes registered in the Eastern Pyrenees (north-eastern Iberian Peninsula) are correlated with both the North Atlantic Oscillation (NAO) and the Western Mediterranean Oscillation (WeMO). The NAO is one of the most important and recurrent patterns of atmospheric circulation variability in the Northern Hemisphere and affects the behaviour of surface temperatures and precipitation in Western Europe. The Western Mediterranean Oscillation index (WeMOi) controls intense precipitation in the eastern part of the Iberian Peninsula. The link between both indices and major avalanche activity is undertaken by applying a cumulative index. A link between avalanche activity and the NAO has been found in Iceland, but it has not been detected in areas closer to the Pyrenees, such as the French Alps. This paper examines the linkage to the NAO in an area further from the centres of the dipole than is the case for Iceland. Results show a significant negative correlation between major avalanche activity in the Eastern Pyrenees and both NAO index (NAOi) and WeMOi, which is even higher with the cumulative NAOi (CNI) and the cumulative WeMOi (CWI). The cumulative index reflects the cumulative effect of snow accumulation in the avalanche starting zones as precipitation is affected by the variations of NAOi and WeMOi. Consequently, the correlation is negative since it has been demonstrated that increased precipitation in the Eastern Pyrenees is linked to negative values of both low frequency patterns. Nevertheless, results from the diverse avalanche forecasting regions in the Eastern Pyrenees suggest a different response of avalanche activity to both indices, confirming the Pyrenees as a complex snow-climate boundary. Lastly, possible changes in avalanche activity in the coming decades may be suggested by the NAO evolution associated with global warming scenarios that are foreseen and the present interannual trend of the WeMOi. (C) 2010 Elsevier B.V. All rights reserved.

**ISSN:** 0165-232X

**DOI:** 10.1016/j.coldregions.2010.08.003

**Record 2 of 21**

**Author(s):** Lopez-Moreno, JI (Lopez-Moreno, J. I.); Vicente-Serrano, SM (Vicente-Serrano, S. M.); Angulo-Martinez, M (Angulo-Martinez, M.); Begueria, S (Begueria, S.); Kenawy, A (Kenawy, A.)

**Title:** Trends in daily precipitation on the northeastern Iberian Peninsula, 1955-2006

**Source:** INTERNATIONAL JOURNAL OF CLIMATOLOGY, 30 (7): 1026-1041 JUN 15 2010

**Abstract:** The temporal evolution of nine daily precipitation indices over the northeastern Iberian Peninsula was analysed for the period 1955-2006, using data from 217 observatories. Cross-tabulation analysis enabled detection of statistically significant overlap among spatial distributions of trends in the study area. There was a general decrease in annual precipitation at most observatories, a decrease in the number of rainy days and precipitation intensity and an increase in the duration of dry spells. The frequency and contribution to annual precipitation of moderate and heavy rainfall events did not change at most observatories, or showed a decreasing trend in these events. There was very large spatial and seasonal variability, with implications for water management and risk assessment in the region. The decrease in precipitation was very marked in headwaters during winter and spring, potentially affecting reservoir management in the region. Heavy rainfall events generally decreased in the west of the region in winter, and in the east of the region in autumn, when these areas are more exposed to hazards related to extreme rainfall. Large differences in the sign and magnitude of trends occurred over very short distances, suggesting the need for dense networks of observatories to ensure reliable and robust detection of regional trends. Copyright (C) 2009 Royal Meteorological Society

**ISSN:** 0899-8418

**DOI:** 10.1002/joc.1945

**Record 3 of 21**

**Author(s):** Fletcher, WJ (Fletcher, W. J.); Goni, MFS (Goni, M. F. Sanchez); Peyron, O (Peyron, O.); Dormoy, I (Dormoy, I.)

**Title:** Abrupt climate changes of the last deglaciation detected in a Western Mediterranean forest record

**Source:** CLIMATE OF THE PAST, 6 (2): 245-264 2010

**Abstract:** Abrupt changes in Western Mediterranean climate during the last deglaciation (20 to 6 cal ka BP) are detected in marine core MD95-2043 (Alboran Sea) through the investigation of high-resolution pollen data and pollen-based climate reconstructions by the modern analogue technique (MAT) for annual precipitation (P-ann) and mean temperatures of the coldest and warmest months (MTCO and MTWA). Changes in temperate Mediterranean forest development and composition and MAT reconstructions indicate major climatic shifts with parallel temperature and precipitation changes at the onsets of Heinrich stadial

1 (equivalent to the Oldest Dryas), the Bolling-Allerod (BA), and the Younger Dryas (YD). Multi-centennial-scale oscillations in forest development occurred throughout the BA, YD, and early Holocene. Shifts in vegetation composition and (P-ann reconstructions indicate that forest declines occurred during dry, and generally cool, episodes centred at 14.0, 13.3, 12.9, 11.8, 10.7, 10.1, 9.2, 8.3 and 7.4 cal ka BP. The forest record also suggests multiple, low-amplitude Preboreal (PB) climate oscillations, and a marked increase in moisture availability for forest development at the end of the PB at 10.6 cal ka BP. Dry atmospheric conditions in the Western Mediterranean occurred in phase with Lateglacial events of high-latitude cooling including GI-1d (Older Dryas), GI-1b (Intra-Allerod Cold Period) and GS-1 (YD), and during Holocene events associated with high-latitude cooling, meltwater pulses and N. Atlantic ice-rafting. A possible climatic mechanism for the recurrence of dry intervals and an opposed regional precipitation pattern with respect to Western-central Europe relates to the dynamics of the westerlies and the prevalence of atmospheric blocking highs. Comparison of radiocarbon and ice-core ages for well-defined climatic transitions in the forest record suggests possible enhancement of marine reservoir ages in the Alboran Sea by 200 years (surface water age 600 years) during the Lateglacial.

ISSN: 1814-9324

---

#### Record 4 of 21

**Author(s):** Pey, J (Pey, Jorge); Perez, N (Perez, Noemi); Querol, X (Querol, Xavier); Alastuey, A (Alastuey, Andres); Cusack, M (Cusack, Michael); Reche, C (Reche, Cristina)

**Title:** Intense winter atmospheric pollution episodes affecting the Western Mediterranean

**Source:** SCIENCE OF THE TOTAL ENVIRONMENT, 408 (8): 1951-1959 MAR 15 2010

**Abstract:** The geographic location of the Western Mediterranean Basin and its peculiar topography, the climatic conditions and the intense anthropogenic and natural emissions of atmospheric pollutants are key factors necessary to interpret the atmospheric aerosol phenomenology over this area. During the cold season it is common to have severe atmospheric particulate matter (PM) pollution episodes (of an anthropogenic origin) affecting this region, not only in the urban and industrial areas but also in the regional and rural sites. During these episodes, the midday hourly PM<sub>1</sub> levels at regional background sites are in many cases higher than those at urban areas. Around 10% of the days under winter anticyclonic conditions registered similar PM<sub>1</sub> levels at the regional background than at the urban area and, sporadically the daily PM<sub>1</sub> levels at the regional background sites may exceed those at urban sites. Furthermore, the very high hourly PM<sub>1</sub> levels measured at regional background sites during these episodes are not regularly attained in the closest urban areas, which leads to the hypothesis that an important formation of secondary aerosols occurs during the transport of the polluted air masses towards the elevated rural sites.

The interpretation of the variability of PM levels and composition (2002-2008) at one urban site (Barcelona) and at one regional background site (Montseny) allows us to illustrate the phenomenology of these scenarios, to quantify the mean annual contributions to the PM levels and to identify their main tracers. Ammonium nitrate appears to be the most abundant compound during these scenarios, although organic species and trace metals also increase markedly. Owing to the intensity, composition and recurrence of these atmospheric pollution episodes, important health, climatic and ecological implications may be derived. (C) 2010 Elsevier B.V. All rights reserved.

ISSN: 0048-9697

DOI: 10.1016/j.scitotenv.2010.01.052

---

#### Record 5 of 21

**Author(s):** Izaguirre, C (Izaguirre, Cristina); Mendez, FJ (Mendez, Fernando J.); Menendez, M (Menendez, Melisa); Luceno, A (Luceno, Alberto); Losada, IJ (Losada, Inigo J.)

**Title:** Extreme wave climate variability in southern Europe using satellite data

**Source:** JOURNAL OF GEOPHYSICAL RESEARCH-OCEANS, 115: Art. No. C04009 APR 7 2010

**Abstract:** A time-dependent generalized extreme value (GEV) model for monthly significant wave height maxima from satellite databases is used to model the seasonal and interannual variability of the extreme wave climate throughout southern Europe. In order to avoid a misleading use of the maxima time series, the classical extreme value model has been modified to cope with nonhomogeneous monthly observations. Seasonality is represented using intraannual harmonic functions in the model, while interannual variability is modeled including North Atlantic and Mediterranean regional scale sea level pressure predictors, such as the North Atlantic Oscillation (NAO), the east Atlantic (EA), or the east Atlantic/western Russian (EA/WR) patterns. The results quantify the strong spatial variability detected in the seasonal location and scale GEV parameters. In general, prominent zonal (west-east) and meridional (north-south) gradients of these location and scale parameters reveal the predominance of low-pressure centers located in the NAO region (e. g., a gradient of 4 m for the location parameter and 1.5 units for the scale parameter between north-south is shown in the month of September). The model also quantifies the influence of regional climate patterns on extreme wave climate. Results show a great influence of NAO and EA on the Atlantic basin (e. g., every unit of the monthly NAO index explains 25 cm of the extreme wave height in the Gulf of Biscay and the EA index explains 20 cm) while the negative phases of EA/WR contribute greatly to the western Mediterranean basin.

ISSN: 0148-0227

Article Number: C04009

DOI: 10.1029/2009JC005802

---

**Record 6 of 21****Author(s):** Guizien, K (Guizien, K.)**Title:** SPATIAL VARIABILITY OF WAVE CONDITIONS IN THE GULF OF LIONS (NW MEDITERRANEAN SEA)**Source:** VIE ET MILIEU-LIFE AND ENVIRONMENT, 59 (3-4): 261-270 DEC 2009

**Abstract:** This study provides the first statistical description of significant height, mean period and direction of waves measured at two sites along the French Mediterranean coast of the Gulf of Lions (Sete and Banyuls-sur-Mer). Sea state is generally quiet in this area with wave heights lower than 1.5 m over more than 80 % of the study duration. However, the seasonality is marked; from July to September, 95 % of wave heights are below 1.5 m, and between April and June, waves with heights between 1.5 m and 3 in treble. From October to March, highly energetic waves (heights of more than 5 m) can be observed. Annual and seasonal statistics for Banyuls-sur-Mer and Sete indicated a spatial variability in the wave conditions for the Gulf of Lions. Large waves (heights above 3 m) are four times more frequent on the Languedoc coast (6 To) than on the Roussillon coast (1.2 %), possibly due to the filtering of southerly swell in this latter area. Conversely, extreme waves reach greater heights in Banyuls than in Sete, implying they originate from the east.

**ISSN:** 0240-8759

---

**Record 7 of 21****Author(s):** Sole, J (Sole, Jordi); Turiel, A (Turiel, Antonio); Estrada, M (Estrada, Marta); Llebot, C (Llebot, Clara); Blasco, D (Blasco, Dolors); Camp, J (Camp, Jordi); Delgado, M (Delgado, Maximino); Fernandez-Tejedor, M (Fernandez-Tejedor, Margarita); Diogene, J (Diogene, Jorge)**Title:** Climatic forcing on hydrography of a Mediterranean bay (Alfacs Bay)**Source:** CONTINENTAL SHELF RESEARCH, 29 (15): 1786-1800 AUG 20 2009

**Abstract:** Time series of meteorological and hydrographic variables were analyzed using Huang's Empirical Mode Decomposition (EMD) to ascertain the relationships among climatic forcings and the hydrographic behavior in an estuarine bay. The EMD method allowed us to separate the different characteristic oscillation patterns (or modes) of a 14 year-long time series of weekly hydrographic (water temperature and salinity) and meteorological (air temperature, pressure, wind and precipitation) data from Alfacs Bay (Ebre delta, NW Mediterranean). In order to explore the relations between couples of oscillation modes from different series, we developed a correlation index based on the phase differences between these modes. Common characteristic modes in the studied series area seasonal pattern and an inter-annual oscillation. The comparison between series of meteorological and hydrographic variables shows significant correlations of two modes (of 1 year and 2-3 year periods, respectively) of water temperature with the corresponding two modes of air temperature and air pressure. There were also significant positive correlations between wind speed and water temperature. The use of EMD allowed to discover a strong connection between stratification and the use of irrigation channels in the bay; in addition, with the help of this method we can propose a common meteorological forcing mechanism for the observed patterns of variability. Those findings would have been impossible to guess by use of classical Fourier methods, and gives a demonstration of the power of EMD in climatic series analysis. (C) 2008 Elsevier Ltd. All rights reserved.

**ISSN:** 0278-4343**DOI:** 10.1016/j.csr.2009.04.012

---

**Record 8 of 21****Author(s):** Begueria, S (Begueria, Santiago); Vicente-Serrano, SM (Vicente-Serrano, Sergio M.); Lopez-Moreno, JI (Lopez-Moreno, Juan I.); Garcia-Ruiz, JM (Garcia-Ruiz, Jose M.)**Title:** Annual and seasonal mapping of peak intensity, magnitude and duration of extreme precipitation events across a climatic gradient, northeast Spain**Source:** INTERNATIONAL JOURNAL OF CLIMATOLOGY, 29 (12): 1759-1779 OCT 2009

**Abstract:** Assessing the characteristics of extreme precipitation over large regions has a great interest. mainly clue to its applications In hazard analysis However. most of the analyses are reduced to daily rainfall intensity due to the fact that most long precipitation records were collected oil a daily basis Hazardous situations related to extreme precipitation events, however. call be originated either by very intense rainfall, or by large accumulated precipitation due to the persistence of the ramy conditions over a long period of time. In this paper. we show (lie use of a methodology bawd oil the extreme-value theory to obtain continuous maps of quantiles.; of precipitation event parameters - peak intensity. magnitude and duration - for a lame region with contrasted climatic characteristics in the northeastern Iberian Peninsula Spatial Models of the probability distributions parameters were calculated. which allowed constructing the regional probability models The analysis was based oil time series of precipitation events. which were obtained from the original daily series. In addition to the usual annual-based analysis. seasonal analyses were also performed. This allowed assessing the differences in the spatial distribution of the probability of extreme events at different times of the year Copyright (C) 2008 Royal Meteorological Society

**ISSN:** 0899-8418**DOI:** 10.1002/joc.1808

---

**Record 9 of 21**

**Author(s):** Gonzalez-Hidalgo, JC (Gonzalez-Hidalgo, Jose Carlos); Lopez-Bustins, JA (Lopez-Bustins, Joan-Albert); Stepanek, P (Stepanek, Petr); Martin-Vide, J (Martin-Vide, Javier); de Luisa, M (de Luisa, Martin)

**Title:** Monthly precipitation trends on the Mediterranean fringe of the Iberian Peninsula during the second-half of the twentieth century (1951-2000)

**Source:** INTERNATIONAL JOURNAL OF CLIMATOLOGY, 29 (10): 1415-1429 AUG 2009

**Abstract:** We analysed monthly precipitation trends on the eastern Mediterranean fringe of the Iberian Peninsula (IP) by means of a new monthly precipitation database [Monthly Precipitation Dataset, Mediterranean Spain (MOPREDA(MES))]. This database was created following an exhaustive quality control of the archives from the Meteorological Agency of Spain (Instituto Nacional de Meteorologia, INM), and comprises 1113 complete and homogeneous monthly precipitation series (1951-2000), covering 180000 km<sup>2</sup> (one-third of IP area). The new data set currently offers the highest spatial density of stations on the IP and around the Mediterranean Sea (1 station/150-200 km<sup>2</sup>), and includes available information at 1500 m asl.

The analyses of monthly precipitation trends indicate high spatial and temporal variability. No global trend in the Study area was found, except for March, when significant negative trends affect the whole study area. Trends for winter months (December-January-February) are dominated by an East-West gradient with a latitudinal temporal shift. Positive trends are mainly located in coastland areas and negatives ones predominate inland. April shows a North-positive South-negative gradient, and the reverse is true for June and September. Negative trends are dominant in October over most of the study area, except for the Pyrenees area. July and August show the most complex spatial distribution pattern, with well-delimited areas of positive trends to the south and northwest. We generally detected no significant trends in May and November.

In order to analyse the nature of rainfall variability in the study area, we also studied the synchronous influence of different low-variability modes [the North Atlantic Oscillation (NAO), the Mediterranean Oscillation (MO) and the Western Mediterranean Oscillation (WeMO)]. On the Mediterranean fringe of the IP precipitation is mainly related to negative phases of the three low-frequency variability patterns analysed, and the MO and the WeMO emerge as predominant teleconnection patterns. These results suggest that monthly variations in rainfall may result from the simultaneous effects of different atmospheric modes of low variability, especially those linked to the Mediterranean region.

Studies making use of high-density precipitation databases, as is the case in this paper, are useful for a better understanding of precipitation behaviour in a complex area like the Mediterranean fringe of the IP. The results also provide valuable information for downscaling and hydrological management. Copyright (C) 2008 Royal Meteorological Society

**ISSN:** 0899-8418

**DOI:** 10.1002/joc.1780

---

#### Record 10 of 21

**Author(s):** De Luis, M (De Luis, Martin); Gonzalez-Hidalgo, JC (Carlos Gonzalez-Hidalgo, Jose); Longares, LA (Longares, Luis Alberto); Stepanek, P (Stepanek, Petr)

**Title:** Seasonal precipitation trends in the Mediterranean Iberian Peninsula in second half of 20th century

**Source:** INTERNATIONAL JOURNAL OF CLIMATOLOGY, 29 (9): 1312-1323 JUL 2009

**Abstract:** This is a study of the changes in annual and seasonal precipitation amounts and variability during the period 1951-2000, using MOPREDA(MES). This dataset includes 1113 complete and homogeneous monthly precipitation time series from the Mediterranean Iberian peninsula (IP), and corresponds to the five official Spanish hydrological divisions which drain into the Mediterranean Sea. The time series of annual and seasonal precipitation were used to test for trends. The absolute value of the anomaly time series was also tested for trends to identify changes in interannual variability of precipitation. The significance of these changes was assessed using the non-parametric Spearman rank test. The intensities of observed changes, both oil mean values and variability, were estimated by using linear regression techniques. Finally, we analysed the area affected by different trends by using raster maps and spatial in addition to calculating the global balances for the five hydrological divisions. We detected high variability ill precipitation regimes and conditions in the study area; nevertheless, a decrease in seasonal and annual precipitation has predominated in the east of the IP during the second half of the 20th century. Oil all annual scale, precipitation has diminished over 90.1% of the study area. Additionally, a high percentage of the territory was affected by diminishing precipitation at a seasonal level: 85% (Of territory) in summer, 82% in spring, 64% during winter and 61% in autumn. Taking the study area as a whole, seasonal precipitation decreases are ranked as follows: summer (-22.5%), spring (-19.3%), winter (-7.3%), and autumn (-5.2%), with a decrease in the Value of (he global mean annual precipitation -12.4%. We also detected an increase of precipitation variability in winter (+23.5%) and Summer (+11.4%), and a decrease ill autumn and spring (-14.9 and -16.8%, respectively) with a global mean value of +7.8%. Copyright (C) 2008 Royal Meteorological Society

**ISSN:** 0899-8418

**DOI:** 10.1002/joc.1778

---

#### Record 11 of 21

**Author(s):** Vicente-Serrano, SM (Vicente-Serrano, Sergio M.); Begueria, S (Begueria, Santiago); Lopez-Moreno, JI (Lopez-Moreno, Juan I.); El Kenawy, AM (El Kenawy, Ahmed M.); Angulo-Martinez, M (Angulo-Martinez, Marta)

**Title:** Daily atmospheric circulation events and extreme precipitation risk in northeast Spain: Role of the North Atlantic Oscillation, the Western Mediterranean Oscillation, and the Mediterranean Oscillation

**Source:** JOURNAL OF GEOPHYSICAL RESEARCH-ATMOSPHERES, 114: Art. No. D08106 APR 22 2009

**Abstract:** We used a novel method that combined probabilistic analysis and spatial modeling assisted by GIS to analyze the risk of extreme precipitation in northeast Spain related to three atmospheric circulation configurations: the North Atlantic Oscillation (NAO), the Mediterranean Oscillation, and the Western Mediterranean Oscillation (WeMO). The analysis was performed at an event-based scale using data obtained from daily atmospheric circulation indices. The maximum intensity and total precipitation magnitude recorded during positive and negative circulation events were obtained from the daily records of 174 observatories between 1950 and 2006. The series of both maximum intensity and magnitude for positive and negative phases of the three atmospheric circulation indices follow a generalized Pareto (GP) distribution. A regression-based interpolation procedure was used to generate distributed maps of GP parameters, enabling us to determine the probability of the magnitude and maximum intensity of precipitation and the quantile precipitation for any return period associated with the positive and negative phases of the three atmospheric circulation patterns. A high spatial variability in precipitation risk was found, depending on the positive/negative phases of the three atmospheric circulation patterns. Different phases of the circulation indices show contrasting effects on the two analyzed parameters. Thus the most extreme daily precipitation during winter months is expected for negative WeMO events, representing a markedly different result from those obtained for other events. In contrast, negative NAO events record the most extreme precipitation magnitude risk per event, although this is mainly restricted to mountainous areas.

ISSN: 0148-0227

Article Number: D08106

DOI: 10.1029/2008JD011492

---

### Record 12 of 21

**Author(s):** Sanchez-Lorenzo, A (Sanchez-Lorenzo, Arturo); Calbo, J (Calbo, Josep); Brunetti, M (Brunetti, Michele); Deser, C (Deser, Clara)

**Title:** Dimming/brightening over the Iberian Peninsula: Trends in sunshine duration and cloud cover and their relations with atmospheric circulation

**Source:** JOURNAL OF GEOPHYSICAL RESEARCH-ATMOSPHERES, 114: Art. No. D00D09 APR 24 2009

**Abstract:** This study analyzes the spatial and temporal changes in sunshine duration (SunDu) and total cloud cover (TCC) over the Iberian Peninsula (IP) and four subregions during 1961-2004 using high-quality, homogenized data sets. The analyses confirm that over most of the IP and in most seasons, SunDu and TCC variations are strongly negatively correlated, with absolute values similar to 0.8-0.9. Somewhat weaker correlations (0.5-0.6) are found in the southern portion of the IP in summer. A large discrepancy between the SunDu and TCC records occurs from the 1960s until the early 1980s when the SunDu series shows a decrease that it is not associated with an increase in TCC. This negative trend or "dimming" is even more pronounced after removing the effects of TCC via linear regression. Since the early 1980s, the SunDu and TCC residual SunDu series exhibit an upward trend or "brightening." In addition to the long-term dimming and brightening, the volcanic eruptions of El Chichon and Mount Pinatubo are clearly evident in the TCC residual SunDu record. The TCC and SunDu records over the IP are well correlated with sea level pressure (SLP), with above normal TCC and below normal SunDu corresponding to below normal SLP locally in all seasons. The TCC and SunDu related SLP changes over the IP in winter and spring are part of a larger-scale north-south dipole pattern that extends over the entire Euro-Atlantic sector. Other more regional atmospheric circulation patterns, identified from rotated principal component analysis, are also linked to TCC and SunDu variations over the IP. Finally and perhaps surprisingly, the TCC residual SunDu series exhibits a statistically significant relationship with a regional atmospheric circulation pattern during spring, summer, and autumn.

ISSN: 0148-0227

Article Number: D00D09

DOI: 10.1029/2008JD011394

---

### Record 13 of 21

**Author(s):** Liqueste, C (Liqueste, Camino); Canals, M (Canals, Miquel); Ludwig, W (Ludwig, Wolfgang); Arnau, P (Arnau, Pedro)

**Title:** Sediment discharge of the rivers of Catalonia, NE Spain, and the influence of human impacts

**Source:** JOURNAL OF HYDROLOGY, 366 (1-4): 76-88 MAR 15 2009

**Abstract:** The environmental and anthropogenic factors controlling sediment delivery to the sea are numerous, intricate and usually difficult to quantify. Mediterranean watersheds are historically amongst the most heavily impacted by human activities in the world. This study analyzes some of these factors for nine river systems from Catalonia, NE Spain, that open into the Northwestern Mediterranean Sea, and discusses the results obtained from sediment yield models and sediment concentration data series.

General models indicate that the natural suspended sediment yield by individual Catalan rivers ranged within a fork from 94 to 621 t km<sup>(-2)</sup> yr<sup>(-1)</sup>. Such a sediment yield would be noticeably reduced (moving the fork to 7-148 t km<sup>(-2)</sup> yr<sup>(-1)</sup>) because of lithological factors and direct anthropogenic and, possibly, climatic impacts. Damming, water extraction and urbanization appear as the most important direct anthropogenic impacts in Catalonia. Water discharge and sediment concentration measurements by basin authorities provide much lower sediment yield estimations, from 0.4 to 19.8 t km<sup>(-2)</sup> yr<sup>(-1)</sup>, which is probably due to the lack of measured sediment loads during flood events, as it is the case in many other Mediterranean rivers.

The Catalan watersheds have some of the smallest runoff values amongst Mediterranean rivers. Of the nine river systems studied, water discharge tends to decrease in two and to increase in one. The other six river systems do not show any clear tendency. Related to climatic parameters, temperature raised in all the watersheds between 1961 and 1990, while precipitation did not

show significant trends. (C) 2008 Elsevier B.V. All rights reserved.

ISSN: 0022-1694

DOI: 10.1016/j.jhydrol.2008.12.013

---

#### Record 14 of 21

**Author(s):** Collos, Y (Collos, Yves); Bec, B (Bec, Beatrice); Jauzein, C (Jauzein, Cecile); Abadie, E (Abadie, Eric); Laugier, T (Laugier, Thierry); Lautier, J (Lautier, Jacques); Pastoureaud, A (Pastoureaud, Annie); Souchu, P (Souchu, Philippe); Vaquer, A (Vaquer, Andre)

**Title:** Oligotrophication and emergence of picocyanobacteria and a toxic dinoflagellate in Thau lagoon, southern France

**Source:** JOURNAL OF SEA RESEARCH, 61 (1-2): 68-75 JAN 2009

**Conference Title:** Workshop on Time Series Data Relevant to Eutrophication and Ecological Quality Indicators

**Conference Date:** SEP 11-14, 2006

**Conference Location:** Tisvildeleje, DENMARK

**Abstract:** Time series data have been examined in Thau lagoon (Southern France) from 1972 to 2006 for water temperature, salinity, nutrients and from 1987 to 2006 for phytoplankton. A first main trend identified is an increase in mean annual water temperature (1.5 degrees C over 33 years or 0.045 degrees C/year) that was not evenly distributed among seasons. The highest rate of increase was in the spring (+ 3.0 degrees C over 33 years), followed by summer (+ 2.0 degrees C and fall (+ 1.7 degrees C. In winter, no significant increase over the 33 year period could be found. A second clear trend is a large decrease in soluble reactive phosphorus (SRP) concentration over the same 33 year period (summer values decreased from 10 mu M to 1 mu M. while winter values decreased from 3 mu M to undetectable at present). Nitrate concentrations depended mainly on rainfall events and watershed runoff. Ammonium data were too fragmentary to be useful. N/P ratios expressed the traditional way of DIN/SRP cannot be used for phytoplankton that are not strict autotrophs. The recent and almost simultaneous appearance of both picocyanobacteria (mostly *Synechococcus*) and the toxic dinoflagellate *Alexandrium catenella* in Thau seem to be related to reduced nutrient loading and the increase in water temperature. *A. catenella* blooms occur either in the spring or the fall when water temperature is near 20 degrees C and remains so for several weeks with winds speeds below 2-3 m s(-1). Picocyanobacterial growth is stimulated by increased summer temperatures, and lowered SRP levels provide picocyanobacteria an ecological advantage over other phytoplankton classes, in particular diatoms such as *Skeletonema costatum* whose cell densities have decreased over the last 8 years in summer and fall, but not in winter. An hypothesis is presented according to which *A. catenella* is not stimulated by increased temperatures, but is able to use picocyanobacteria for growth, and this provides this organism an additional resource over other strictly autotrophic phytoplankton. On a more general level, our data do not support the hypothesis that increased nutrient loading leads to harmful blooms of dinoflagellates. Instead, a combination of habitat disturbance and species displacement seems to lead to such blooms. (C) 2008 Elsevier B.V. All rights reserved.

ISSN: 1385-1101

DOI: 10.1016/j.seares.2008.05.008

---

#### Record 15 of 21

**Author(s):** Berjano, R (Berjano, R.); Ortiz, PL (Ortiz, P. L.); Arista, M (Arista, M.); Talavera, S (Talavera, S.)

**Title:** Pollinators, flowering phenology and floral longevity in two Mediterranean *Aristolochia* species, with a review of flower visitor records for the genus

**Source:** PLANT BIOLOGY, 11 (1): 6-16 JAN 2009

**Abstract:** The pollination of *Aristolochia* involves the temporary confinement of visitors inside the flower. A literature review has shown that some species are visited by one or a few dipteran families, while others are visited by a wider variety of dipterans, but only some of these are effective pollinators. We observed flowering phenology and temporal patterns of pollinator attendance in diverse populations of *Aristolochia baetica* and *A. paucinervis*, two species that grow in SW Spain, frequently in mixed populations. The two species had overlapping floral phenologies, extended flowering periods and long-lived flowers. *A. baetica* attracted a higher number of visitors than *A. paucinervis*. Drosophilids and, to a lesser extent, phorids, were the main pollinators of *A. baetica*, whereas in *A. paucinervis*, phorids were the only pollinators. Attendance to *A. paucinervis* flowers by phorids in mixed populations was markedly lower than in pure populations. This effect was more evident in years with lower pollinator density. Our results suggest that *A. baetica* and *A. paucinervis* may compete for pollinators in mixed populations.

ISSN: 1435-8603

DOI: 10.1111/j.1438-8677.2008.00131.x

---

#### Record 16 of 21

**Author(s):** Lopez-Bustins, JA (Lopez-Bustins, Joan-Albert); Martin-Vide, J (Martin-Vide, Javier); Sanchez-Lorenzo, A (Sanchez-Lorenzo, Arturo)

**Title:** Iberia winter rainfall trends based upon changes in teleconnection and circulation patterns

**Source:** GLOBAL AND PLANETARY CHANGE, 63 (2-3): 171-176 Sp. Iss. SI SEP 2008

**Abstract:** Winter rainfall on the Iberian Peninsula presents a significant decrease in its western and central areas throughout the second half of the 20th century, whereas over the eastern fringe it shows hardly any variation. This spatial distribution of precipitation trends are related to teleconnection indices trends and changes in the frequency Of Surface circulation patterns over Western Europe. We determined these circulation patterns by carrying out a daily objective synoptic classification by means of a principal components analysis (PCA) using sea-level pressure (SLP) data. In order to better understand Iberian winter precipitation trends, circulation patterns are associated with those teleconnection patterns that have an important influence on Iberian rainfall: Arctic Oscillation (AO), North Atlantic Oscillation (NAO) and Western Mediterranean Oscillation (WeMO). The circulation pattern showing the biggest increases involves high pressure over Central Europe. This pattern is showing a positive AO and NAO phase, and simultaneously, a negative WeMO phase. (C) 2007 Elsevier B.V. All rights reserved.

**ISSN:** 0921-8181

**DOI:** 10.1016/j.gloplacha.2007.09.002

---

#### Record 17 of 21

**Author(s):** Azorin-Molina, C (Azorin-Molina, Cesar); Lopez-Bustins, JA (Lopez-Bustins, Joan-Albert)

**Title:** An automated sea breeze selection technique based on regional sea-level pressure difference: WeMOi

**Source:** INTERNATIONAL JOURNAL OF CLIMATOLOGY, 28 (12): 1681-1692 OCT 2008

**Abstract:** A recently defined regional teleconnection pattern for the western Mediterranean basin (western Mediterranean Oscillation, WeMO) has allowed an objective quantification of the synoptic circulation factor on the occurrence of sea breezes. The associated WeMO index (WeMOi) can be used as an initial objective filter for selecting ideal surface pressure conditions for sea breeze development. Applying this filter to the sea breeze database created for Alicante (reference synoptic station) and performing a manual selection method for the 2-year period (1999-2000), we confirmed the potential use of this objective primary criterion. We used wind speed (WS) and direction (WD) data from 9 coastline meteorological stations to assess the WeMOi applicability to the Iberian Mediterranean coast and the Balearic Isles. The [-1, 1] threshold interval of the daily WeMOi was seen to be a good proxy for detecting weak pressure gradients at surface level. Observational and numerical sea breeze studies require quality databases in order to analyse in depth the main characteristics and physical processes controlling sea breezes. This automated selection technique enabled us to improve the accuracy and processing time of the filter methods for finding sea breeze days by adding a new objective criterion. This new threshold technique [-1, 1], based on regional sea-level pressure (SLP) difference, is adaptable to any coastal region at mid-latitudes where a regional barometric dipole can be defined. A regional teleconnection pattern, such as the WeMOi, could be used as a suitable tool for forecasting sea breeze occurrence. Copyright (C) 2008 Royal Meteorological Society

**ISSN:** 0899-8418

**DOI:** 10.1002/joc.1663

---

#### Record 18 of 21

**Author(s):** Ghasemi, AR (Ghasemi, Ahmad Reza); Khalili, D (Khalili, Davar)

**Title:** The association between regional and global atmospheric patterns and winter precipitation in Iran

**Source:** ATMOSPHERIC RESEARCH, 88 (2): 116-133 MAY 2008

**Abstract:** This paper attempts to find the associations between the atmospheric circulation patterns ranging from regional to global scales and winter precipitation patterns over Iran. This study utilizes Principal Component Analysis (PCA), running correlations and composite maps for extremely dry and wet conditions. A PCA of winter precipitation reveals five components that account for 63% of the total variance. Analyses of SLP and GPH fields reveal five anomalous pressure centers over Kazakhstan, Syria, the Indian Peninsula, the North Sea and the northwestern African coast during wet conditions in Iran. These pressure centers make a special wind pattern, causing prevailing westerlies towards the Arabian Peninsula, that curve northward by an anticyclonic wind pattern over the Indian Peninsula. This pattern is destroyed in dry conditions and is replaced by the cold and dry northeasterly winds. The results also show that the zonal (meridional) wind during wet conditions is weaker (stronger) than the dry conditions. The five pressure centers are also found to be associated with some atmospheric indices. The strongest results are found for the North Sea-Caspian Pattern (NCP) and the Western Mediterranean Oscillation (WeMO) indices. These two indices have the most significant correlation with the PCs in Iran. Analyses of the results also reveal that the winter precipitation in Iran is mainly related to the Black Sea and the Mediterranean SLP. The best linkage is found between the Black Sea SLP and the PC4, expressed by correlation coefficients varying from 0.43 to 0.57. Our results also indicate that, the Red Sea trough under wet winter conditions in Iran is accompanied by a deep 850 and 500-hPa trough, located west of the Mediterranean. This trough is strongly weakened during dry conditions. We also found that, the winter precipitation PCs are controlled by some atmospheric indices. The best result is found for the PC1 that is affected by the WeMO and the Scandinavian Pattern. (c) 2007 Elsevier B.V. All rights reserved.

**ISSN:** 0169-8095

**DOI:** 10.1016/j.atmosres.2007.10.009

---

#### Record 19 of 21

**Author(s):** Lopez-Moreno, JI (Lopez-Moreno, Juan I.); Begueria, S (Begueria, Santiago); Vicente-Serrano, SM (Vicente-Serrano, Sergio M.); Garcia-Ruiz, JM (Garcia-Ruiz, Jose M.)

**Title:** Influence of the North Atlantic Oscillation on water resources in central Iberia: Precipitation, streamflow anomalies, and reservoir management strategies

**Source:** WATER RESOURCES RESEARCH, 43 (9): Art. No. W09411 SEP 21 2007

**Abstract:** This paper analyzes the influence of the extreme phases of the winter North Atlantic Oscillation (NAO) on water resources in the Spanish region of the Tagus River basin. By analyzing a winter NAO index based on station sea level pressure, the years between 1957 and 2003 were classified as normal, positive, and negative NAO years. A statistical test was then applied to monthly data series of precipitation, river discharge, reservoir storage, and reservoir release to analyze the variations in these variables. For all four variables, significant differences were found between positive and negative NAO years, the former resulting in reduced water availability ( negative anomalies) and the latter resulting in increased water availability ( positive anomalies). The influence of extreme NAO winters was found to act with different time lags on different variables: The effect of extreme NAO winters on precipitation was found to be quite immediate ( and significant for December to March), but this effect was observed later in the year and lasted longer for river discharge, reservoir storage, and water release. Positive and negative NAO years were also found to have different effects on these variables, in that the effects of positive years were more sustained and those of negative years were more rapid and less prolonged. In spite of the high variability of the availability of water resources, the strategies for management of the reservoir system of the basin were found in most cases to provide a regular supply that meets water demands. However, our results also indicate that these water management practices are not adequate for the expected scenarios of climate change and increasing water demand.

**ISSN:** 0043-1397

**Article Number:** W09411

**DOI:** 10.1029/2007WR005864

---

### Record 20 of 21

**Author(s):** Lopez-Bustins, JA (Lopez-Bustins, Joan-Albert); Esteban, P (Esteban, Pere); Labitzke, K (Labitzke, Karin); Langernatz, U (Langernatz, Ulrike)

**Title:** The role of the stratosphere in Iberian Peninsula rainfall: A preliminary approach in February

**Source:** JOURNAL OF ATMOSPHERIC AND SOLAR-TERRESTRIAL PHYSICS, 69 (12): 1471-1484 AUG 2007

**Abstract:** This paper attempts to establish a connection between stratospheric anomalies in the North Pole and rainfall on the Iberian Peninsula through the occurrence of major midwinter warmings (MMWs) and cold events (CEs), taking February as a preliminary approach. We define the MMWs as the warmings which break down the polar vortex, whereas the CEs are the episodes in which the polar vortex remains cold and undisturbed. Both anomalies lead to a wind anomaly around the north polar stratosphere, which is connected with a shortly lagged tropospheric anomaly through a stratosphere-troposphere Coupling in winter. A T-mode principal component analysis (PCA) was used as an objective pattern classification method for identifying the main daily surface-level pressure (SLP) patterns for February for the 1961-1990 reference period. Subsequently, those February months with an MMW or a CE influence in the troposphere are identified in the whole study period (1958-2000) by means of the Arctic Oscillation Index (AOI). Thus, performing the same analysis for the selected February months, new principal patterns for detecting changes in surface circulation structure and 9 morphology are obtained. The results show a significant decrease in the westerlies and a southward shift of the storm tracks in Western Europe some weeks after an MMW occurrence, leading to an increase in precipitation in western Iberia and a slight decrease on the eastern Mediterranean fringe. The results are quite the opposite under a CE influence: the westerlies are strengthened and shifted northwards due to the displacement of the Atlantic anticyclone towards Central Europe, dry conditions are established throughout Iberia, except for the Mediterranean fringe, where precipitation shows a considerable increase due to the greater frequency of the northeasterly winds. Finally, an 11-year sunspot cycle-quasi-biennial oscillation (QBO) modulation might be demonstrated in Iberian rainfall in February through the occurrence of these stratospheric anomalies. (C) 2007 Elsevier Ltd. All rights reserved.

**ISSN:** 1364-6826

**DOI:** 10.1016/j.jastp.2007.05.015

---

### Record 21 of 21

**Author(s):** Grbec, B (Grbec, B.); Vilibic, I (Vilibic, I.); Bajic, A (Bajic, A.); Morovic, M (Morovic, M.); Paklar, GB (Paklar, G. Bec); Matic, F (Matic, F.); Dacic, V (Dacic, V.)

**Title:** Response of the Adriatic Sea to the atmospheric anomaly in 2003

**Source:** ANNALES GEOPHYSICAE, 25 (4): 835-846 2007

**Abstract:** Unusual weather conditions over the southern Europe and the Mediterranean area in 2003 significantly impacted the oceanographic properties of the Adriatic Sea. To document these changes, both in the atmosphere and the sea, anomalies from the normal climate were calculated. The winter 2003 was extremely cold, whereas the spring/summer period was extremely warm. The air temperature in June was more than 3 standard deviations above the average. On the other hand, precipitation and river runoff were extremely low between February and August. The response of the sea was remarkable, especially in surface salinity during spring and summer, with values at least one standard deviation above the average. Analysis of thermohaline properties in the middle Adriatic showed the importance of two phenomena responsible for the occurrence of exceptionally high salinity: (1) enhanced inflow of saline Levantine Intermediate Water (LIW) in the Adriatic, and (2) extremely low precipitation and river runoff, accompanied with strong evaporation. Two large-scale atmospheric indices: NAOI (North Atlantic Oscillation Index) and

MOI (Mediterranean Oscillation Index), although generally correlated to the Adriatic climate, failed to describe anomalies in 2003. The air pressure gradients used for the definition of both indices significantly decreased in 2003 due to the presence of the high pressure areas over most of Europe and the northern Atlantic, and were actually responsible for the observed anomalies above and in the Adriatic.

ISSN: 0992-7689

---

[Back to Results](#)

**ISI Web of Knowledge**  
**Page 1 (Articles 1 -- 21)**

◀ [ 1 ] ▶

[Print This Page](#)

---

[Acceptable Use Policy](#)  
Copyright © 2008 Thomson Reuters