



I FORO INTERREGIONAL
MEDITERRÁNEO DE LUCHA
CONTRA LA DESERTIFICACIÓN

I FORUM INTERRÉGIONAL
MÉDITERRANÉEN DE LUTTE
CONTRE LA DÉSERTIFICATION

I INTERREGIONAL
MEDITERRANEAN
FORUM TO COMBAT
DESERTIFICATION



Climate change in Danube Delta Biosphere Reserve



Valentin Moldoveanu – Country Concile Tulcea





Introduction – generalities (I)



- Climate change research is taking place in the context of more and more frequent manifestations of extreme meteorological phenomena (maximum temperatures, minimum temperatures, intense rainfall, extreme drought etc.)
- In the scientific world there are two important sides for defining climate change, namely: the first category includes researchers from all spheres of research who claim that these climate changes are induced by human's "industrial" behavior, especially after the second stage of industrial revolution. This "industrial behavior" has led to greenhouse gases emissions.



Organizado por:



Financiado por: Programa LIFE de la Unión Europea



Climate change adaptation
of dryland agricultural systems
in the Mediterranean area

LIFE AMDRYC4 - LIFE16 CCA/ES/000123



Introduction – generalities (II)



- The second side of researchers are the ones who are convinced that these climate changes are normal in the evolution of the planet and that the influence of human society can be negligible in relation to the ability of the planet's mechanisms to regulate its properties (including carbon dioxide). The main argument of those considering climate change as cyclical variability is the fact that the measured data on climate is very short in relation to the lifetime of our planet. Thus, the data string presents only a very short period (equivalent to a picture of the moment) state of Terra's climate.

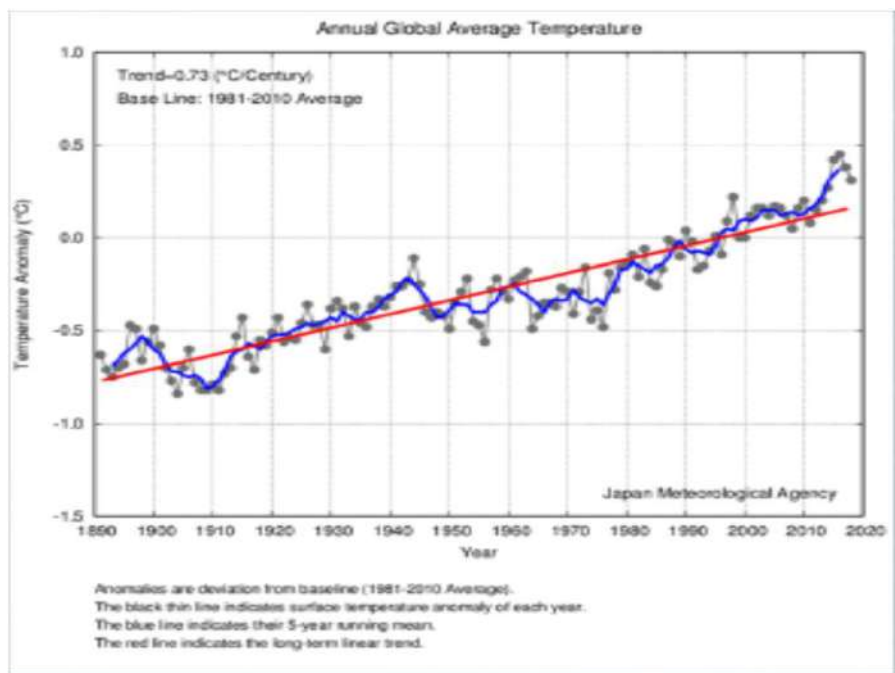




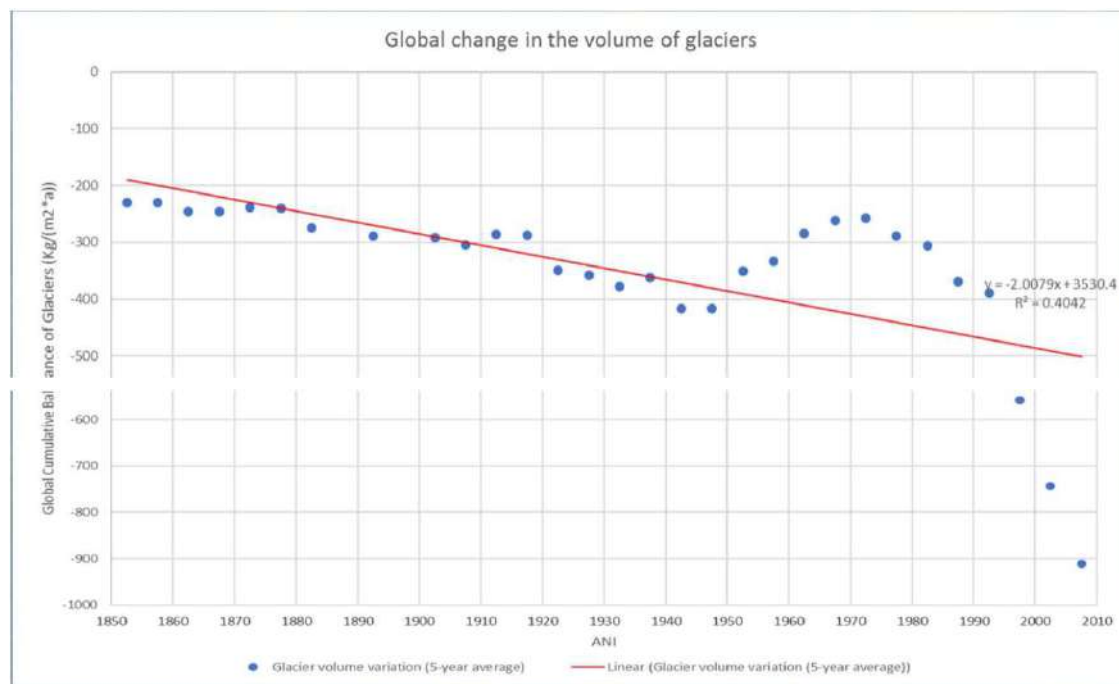
Introduction – proves of climate changes (I)



Temperature is changing



Glaciers are melting

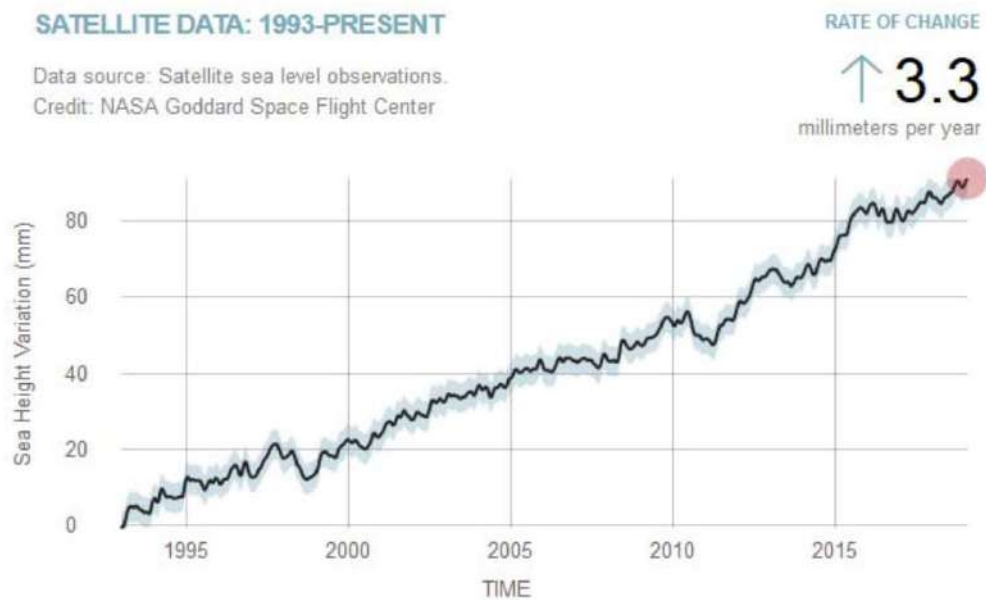




Introduction – proves of changes (II)



Sea level rising





Materials and method

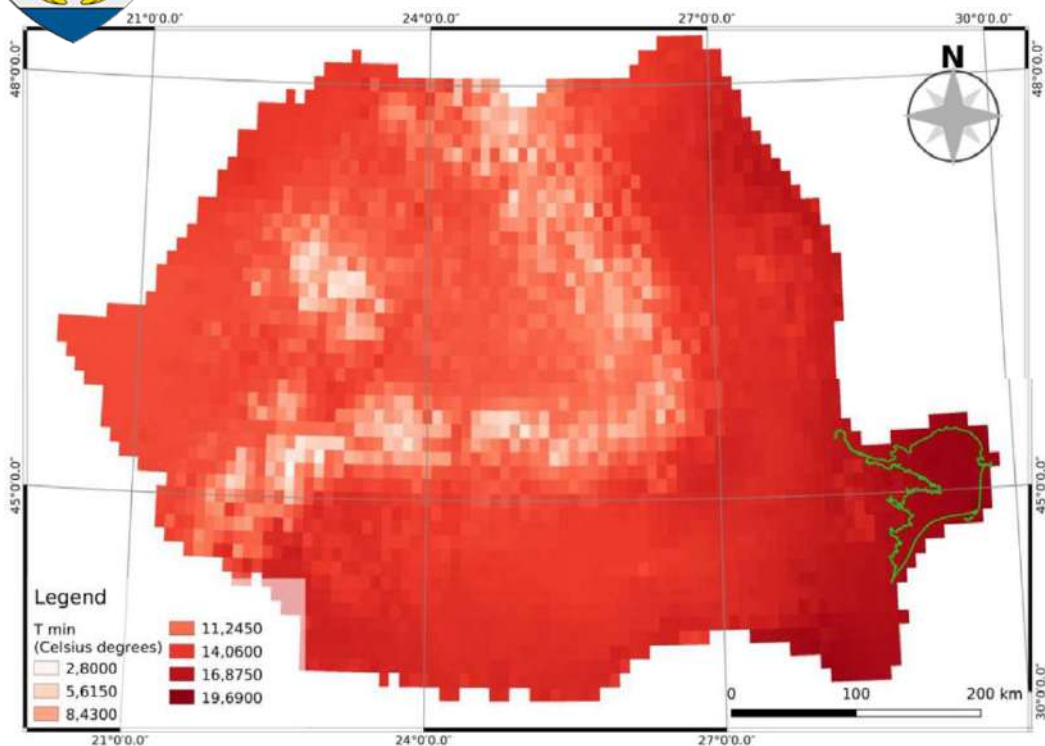


- Climate studies have many climatic and / or meteorological parameters that can be taken into account for more or less accurate analysis. In the case of this study, one meteorological variable was chosen, namely: minimum air temperature to develop the index named “tropical nights”. Tropical nights are nights where the minimum air temperature is equal or above 20°C.
- For a unitary image of the data used in the study of the evolution of the chosen index, the ROCADA data set (Romanian ClimAteric DAta Set) was selected.
- This data set provides daily recordings of nine meteorological variables covering the years 1961-2013 that were used to create a homogenized climate data set for the entire territory of Romania at a spatial resolution of 0.1°. (Dumitrescu, Bîrsan, 2015)

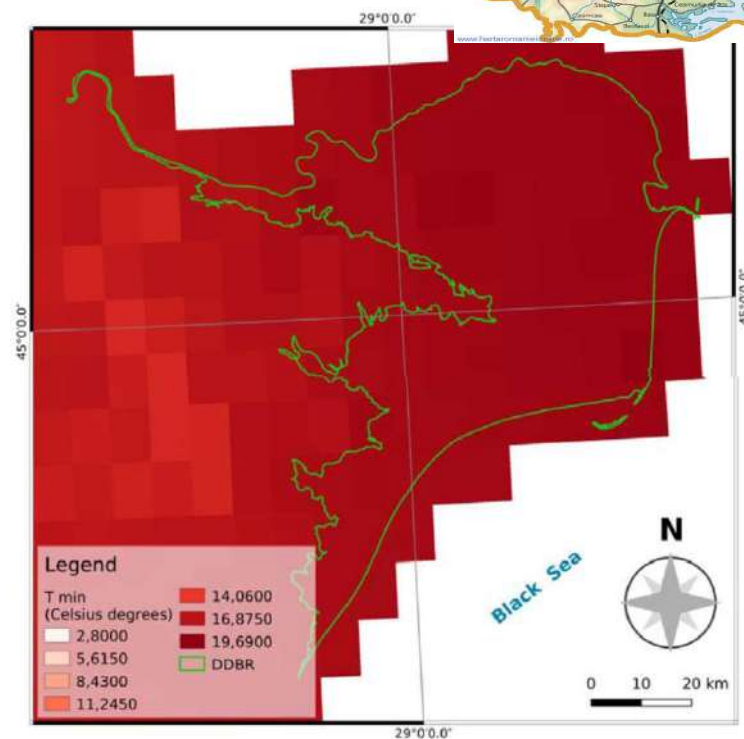




Materials and method



Meteorological data set grid for Romania (example minimum temperature of a summer day) (source:ROCADA)



Meteorological data set grid for Danube Delta Biosphere Reserve (DDBR) (example minimum temperature of a summer day) (source: extract from ROCADA)





Materials and method



- The dataset (Tmin) was clipped by the limit of the Danube Delta Biosphere Reserve (RBDD). The clipping process was executed using Quantum GIS software.
- The clipped dataset was separated in years from 1961 to 2013, inclusively. Thus, it resulted in 53 subdatasets with minimum air temperatures. The separation for each year was done with the help of Climate Data Operators (CDO).
- For each subdataset (that contained around 365 layers – for each day one layer) there was calculated the sum of days with temperature equal or higher than 20°C. This process was accomplished using Climate Data Operators (CDO).



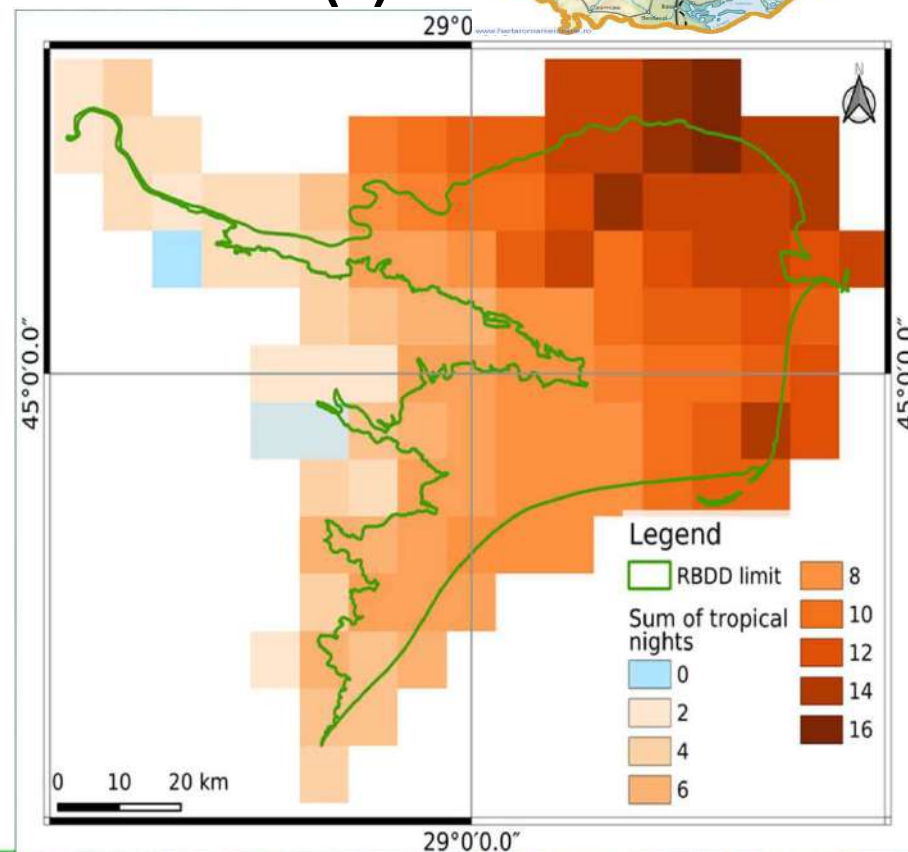


Results and discussions (I)



- Following the calculation of the sum of days with minimum temperature equal or higher than 20°C resulted a raster that shows total number of tropical nights.

The figure presents the number of tropical nights for year 1965 within DDBR.

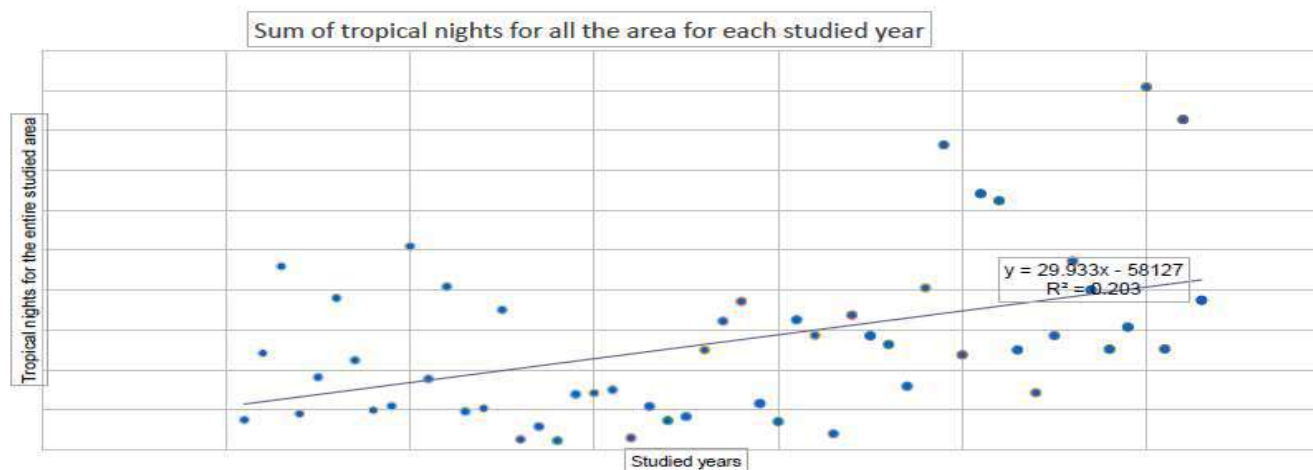




Results and discussions (II)



- For each raster resulted in the process of summing the tropical nights there were calculated some mathematical parameters (for examples: sum, average, range, min, max and standard deviation).
- In order to show some changes in the studied period there were done some graphs.

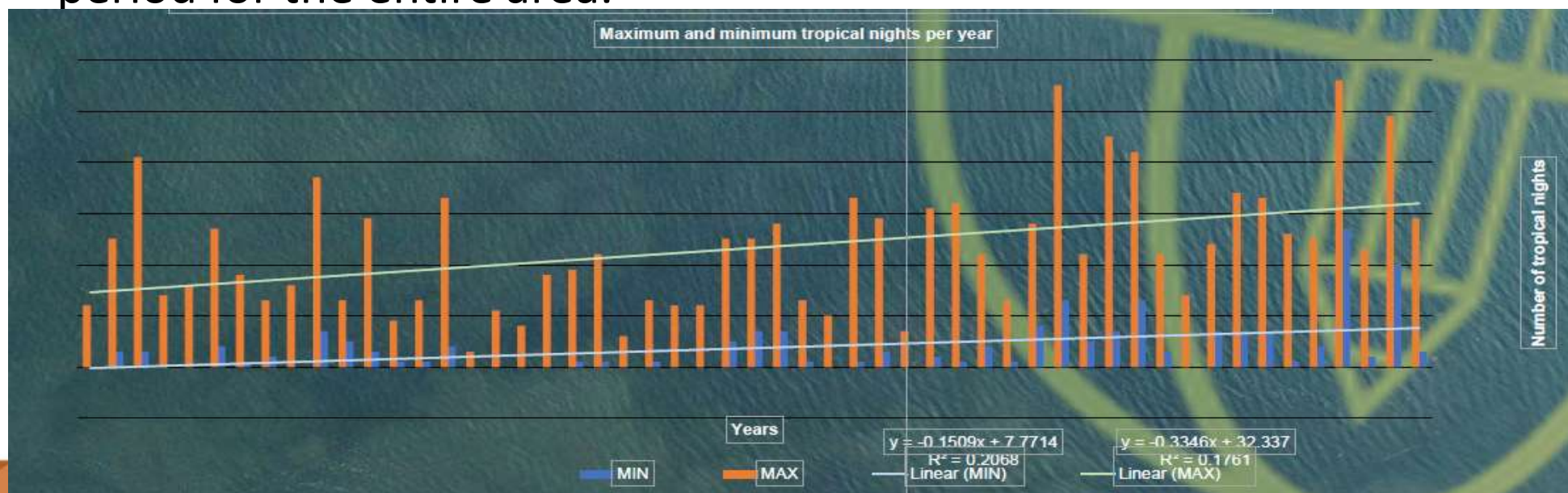




Results and discussions (III)



- Another graph is the one that shows the minimum and maximum for the number of the tropical nights for each year from the studied period for the entire area.

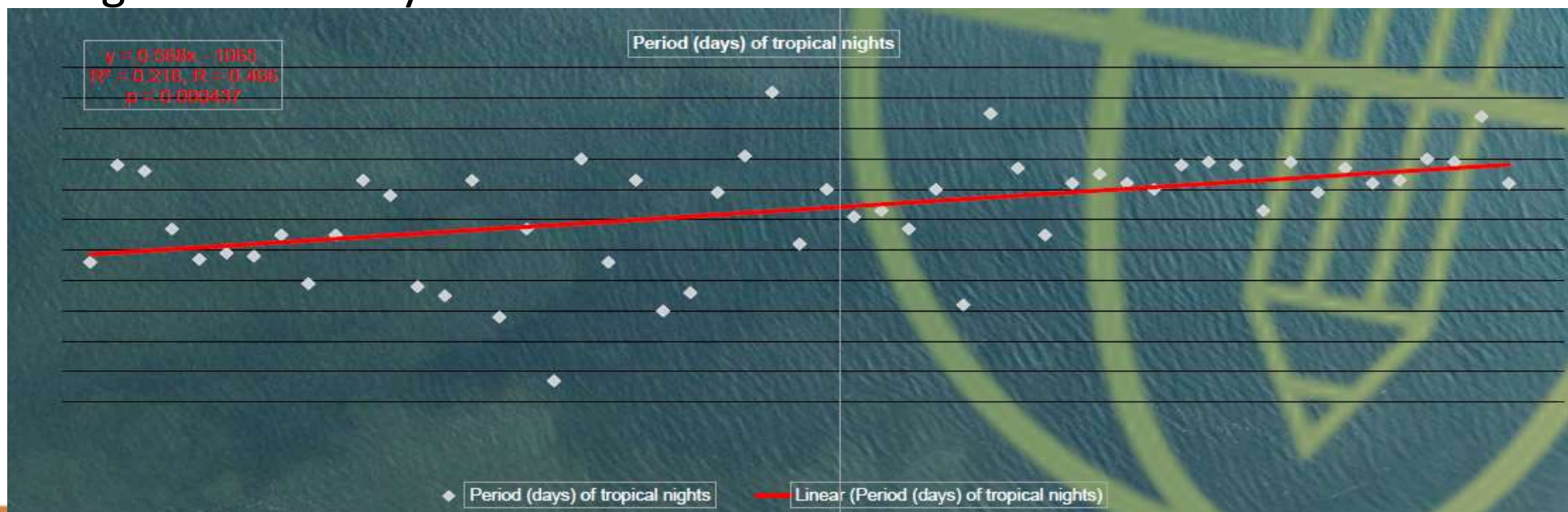




Results and discussions (IV)



- It was observed that across the studied period the entire group of days from the first occurrence to the last occurrence of the tropical nights has slowly increased.





Conlusions

- Daily meteorological parameters measurements are vital for “seeing” the most “real face” of the climate;
- It is obvious that the sum per year of the tropical nights increased, showing once again that in Danube Delta Biosphere Reserve the climate is changing;
- The trend of the maximum and minimum number of the tropical nights within the studied area is ascending;
- The period of days from the first occurrence and the last occurrence of the tropical nights has increased, fact that demonstrate an warming process in the studied area.





I FORO INTERREGIONAL MEDITERRÁNEO DE
LUCHA CONTRA LA DESERTIFICACIÓN

I FORUM INTERRÉGIONAL MÉDITERRANÉEN DE
LUTTE CONTRE LA DESERTIFICATION

I INTERREGIONAL MEDITERRANEAN FORUM
TO COMBAT DESERTIFICATION

Organizado por:



Financiado por: Programa LIFE de la Unión Europea



Climate change adaptation
of dryland agricultural systems
in the Mediterranean area

LIFE AMDRYC4 - LIFE16 CCA/ES/000123