

TAKING
COOPERATION
FORWARD

 *2nd International Conference “Managing the protection of Cultural Heritage in changing environment”*

Municipal House, nám. Republiky 5, 111 21 Staré

 **ProteCHt2save Web GIS Tool for Risk Mapping**

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PROTECHT2SAVE WEB GIS TOOL FOR RISK MAPPING

Introduction

Map filters <

Map filters

Risk index

r95pTOT

Scenarios

MODELS

Model

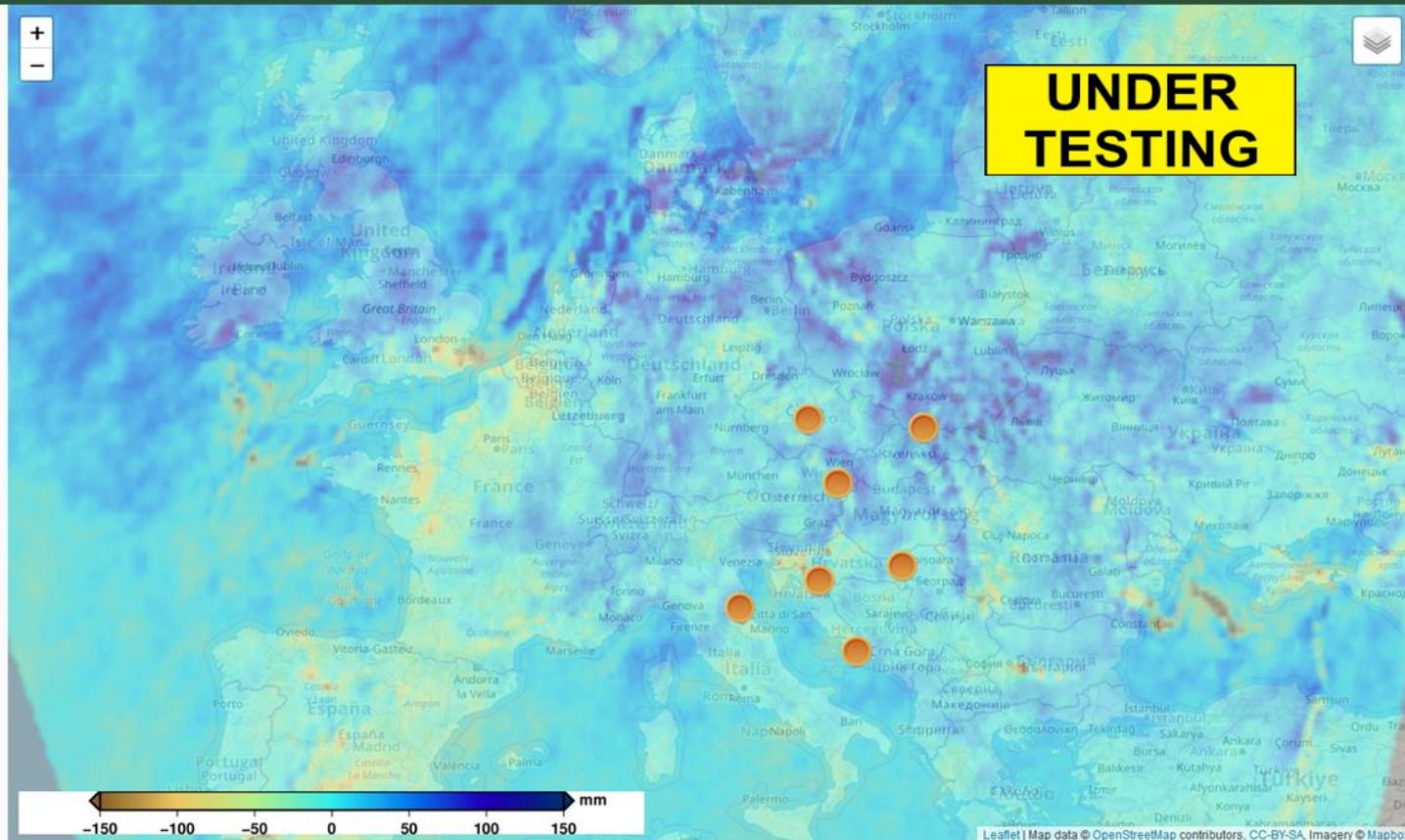
EC-EARTH_HIRAMS

Map

r95p_ICHEC-EC-EARTH-DMI-HIRHAM5_

Opacity

0.5



Designed to support regional and local authorities to prepare measures and evacuation plans in case of emergencies for building resilience of cultural heritage to extreme events linked to climate change

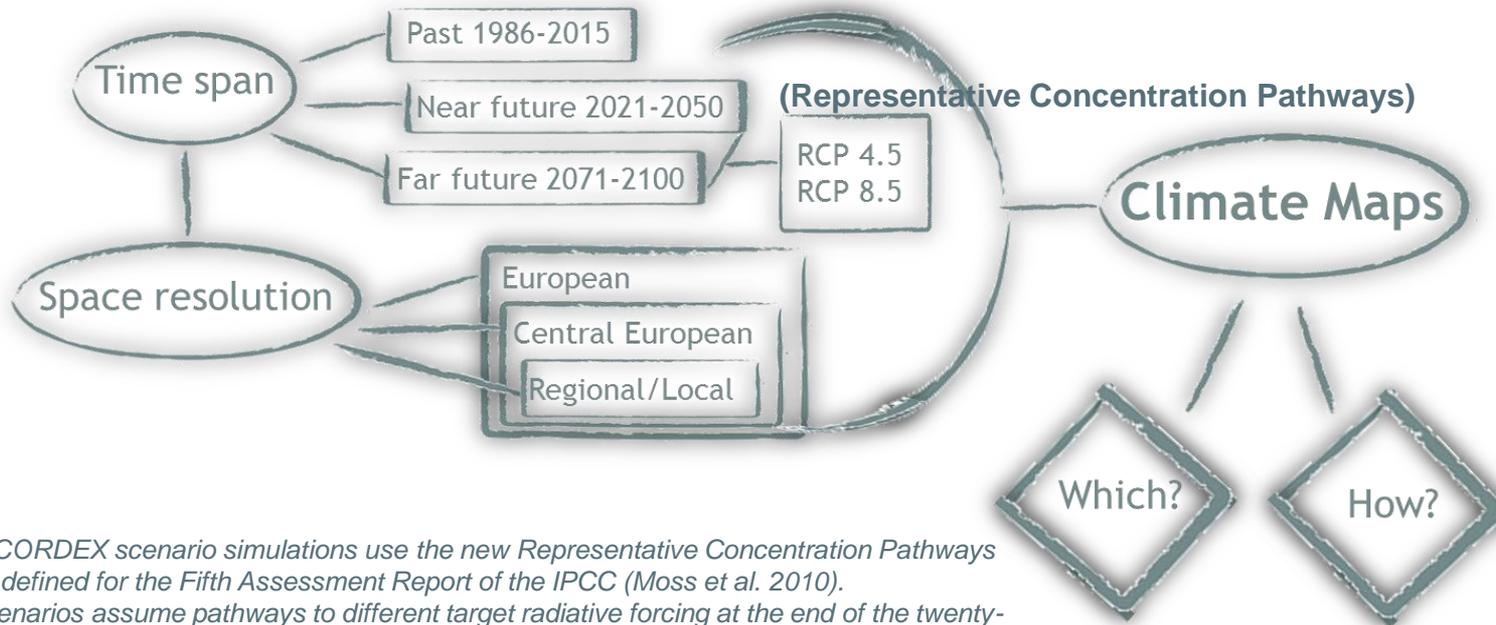
WP T1 Identification of risk areas and priorities

WP T1 OUTPUTS

- | | | |
|--------|---|--|
| O.T1.1 | Inventory of existing archives, maps, databases, model outputs for risk evaluation (state of art) | Data harmonization and management. Information from existing CC simulations/scenarios/NatCatSERVICE database on loss events due to natural hazards/existing national emergency plans for natural disaster response |
| O.T1.2 | Development of local maps for risk management and protection of cultural heritage | Production of a map creator ICT tool aiming at assessing risk prone areas and “hot spots” where multiple concurrent hazards lead to potential impacts on CH. |
| O.T1.3 | Compilation of a comprehensive set of Manual for mitigation and adaptation | The Manual will offer adaptation strategies for CH management in the face of climate change, with the main aim of assisting heritage stakeholders, policy and decision makers. |



CLIMATE DATA, DOWNSCALING AND ANALYSIS TOOLS



EURO-CORDEX scenario simulations use the new Representative Concentration Pathways (RCPs) defined for the Fifth Assessment Report of the IPCC (Moss et al. 2010). RCP scenarios assume pathways to different target radiative forcing at the end of the twenty-first century. For instance, scenario RCP8.5 assumes an increase in radiative forcing of 8.5 W/m² by the end of the century relative to pre-industrial conditions.

D.T1.2.2
D.T1.2.3

Elaboration of maps with hot spots of extreme potential impacts on CH

CLIMATE DATA, DOWNSCALING AND ANALYSIS TOOLS

General Framework

Regional Climate Models (RCMs)

10-50 km

Downscaling

Bias correction

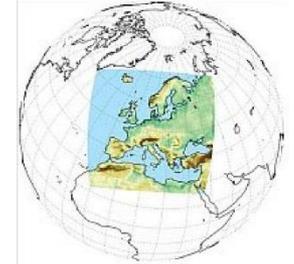
Statistic/Stochastic Downscaling

1 km

ProteCht2save

Euro-CORDEX (Coordinated Downscaling Experiment - European Domain) RCMs

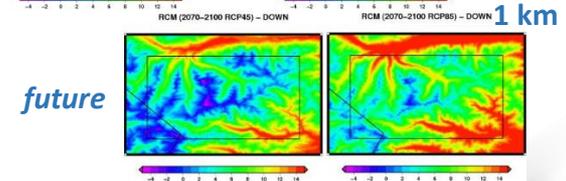
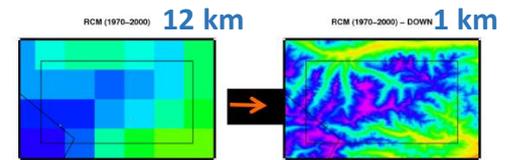
- 0.11° lat-lon resolution (~12 km)
- Historical and future simulations
- Two future scenarios (RCP4.5 and RCP8.5)



Station based reference dataset E-OBS (25 km), used for correcting the temperature and precipitation provided by the RCMs.

Use of the **RainFARM** downscaling technique: **temperature and precipitation downscaling with orographic correction**

historical



future

D.T1.2.2
D.T1.2.3



CLIMATE EXTREMES AND METRICS

The analysis of changes in climate extremes, such as dry spells or intense precipitation, exploited software tools which are being developed in the framework of the Copernicus C3S project MAGIC (C3S 34a lot2) by ISAC-CNR (<http://portal.c3s-magic.eu/>).

The tools are collected in an integrated software tool (ESMValTool) and provide indices to evaluate **statistics of extreme events for temperature and precipitation** and to compare with observed extremes. They implement standard indices defined by the Expert Team on Climate Change Detection Indices (ETCCDI) and other indices measuring hydroclimatic intensity.

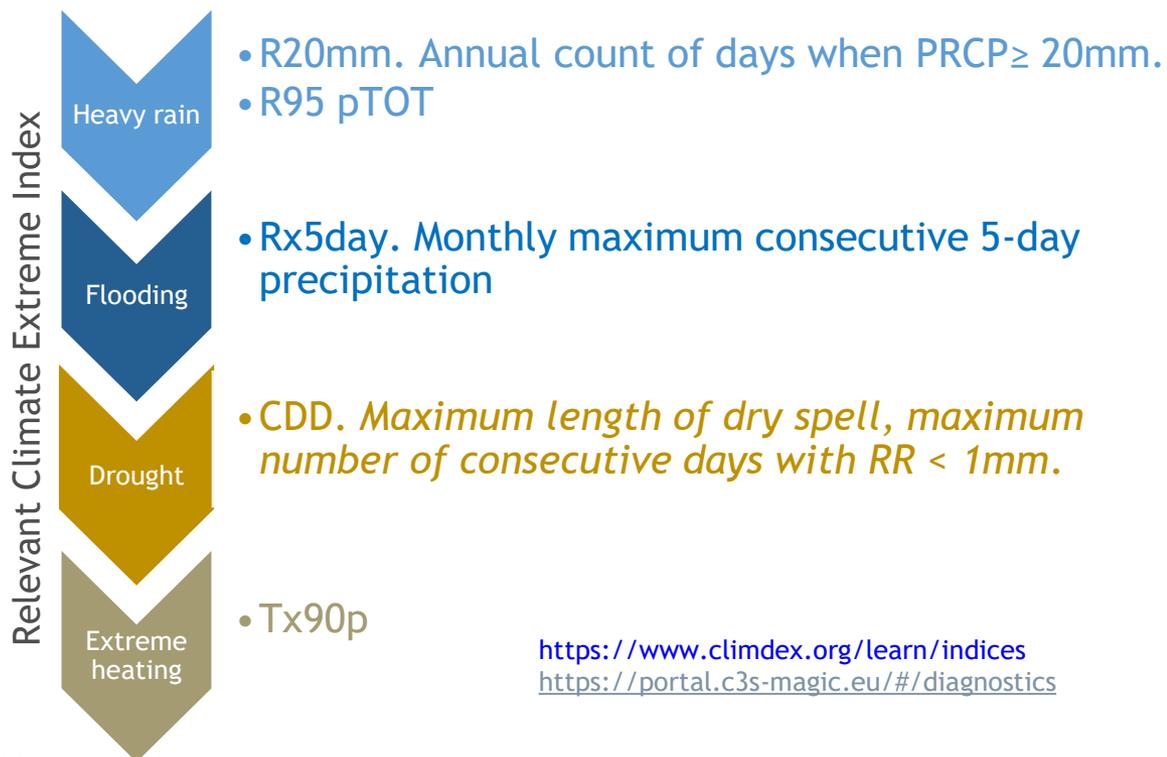
Data from models has been used for the production of :

- i) maps of changes of principal climate variables (temperature and precipitation)
- ii) maps related to climate extremes by using indexes selected among those defined by the CCI/WCRP/JCOMM Expert Team on Climate Change Detection and Indices (ETCCDI) (<http://www.climdex.org/indices.html>)

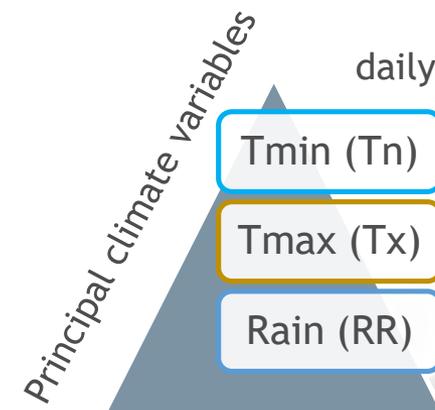


CLIMATE EXTREMES AND METRICS

Indexes selected to evaluate statistics of extreme events for temperature and precipitation and to compare with observed extremes



<https://www.climdex.org/learn/indices>
<https://portal.c3s-magic.eu/#/diagnostics>



ELABORATION OF MAPS WITH HOT SPOTS OF EXTREME POTENTIAL IMPACTS ON CH



Summary

8 maps	Past (1987-2016) wrt (1951-1980)
>8 maps	Near future (2021-2050) wrt (1975-2005) RCP4.5
>8 maps	Near future RCP8.5
>8 maps	Far future (2071-2100) wrt (1975-2005) RCP4.5
>8 maps	Far future RCP8.5

Number of maps produced: > 40

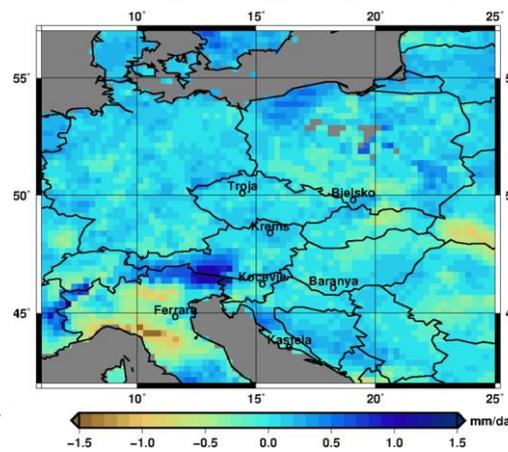


ELABORATION OF MAPS WITH HOT SPOTS OF EXTREME POTENTIAL IMPACTS ON CH

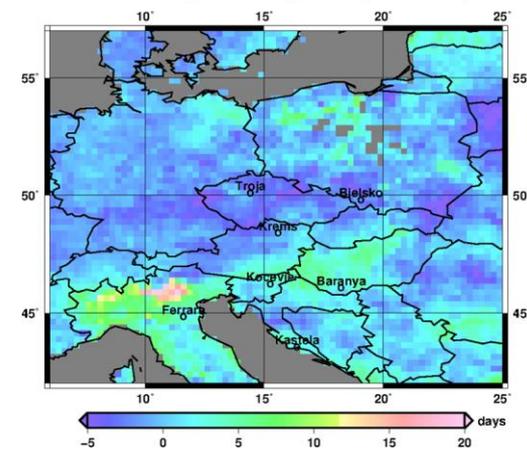
Changes in (1987-2016) wrt (1951-1980) of precipitation and precipitation-related extremes (CDD, R20mm, R99pTOT, Rx5day) in Central Europe

Data source: E-OBS

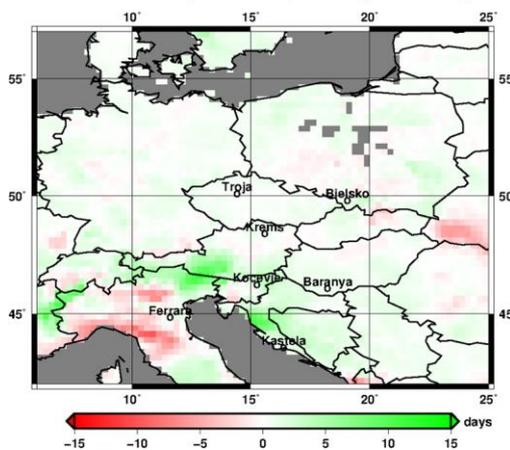
EOBS RR [1987-2016] minus [1951-1980]



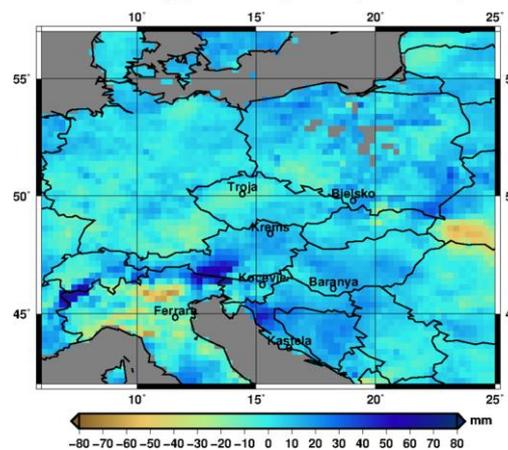
EOBS CDD [1987-2016] minus [1951-1980]



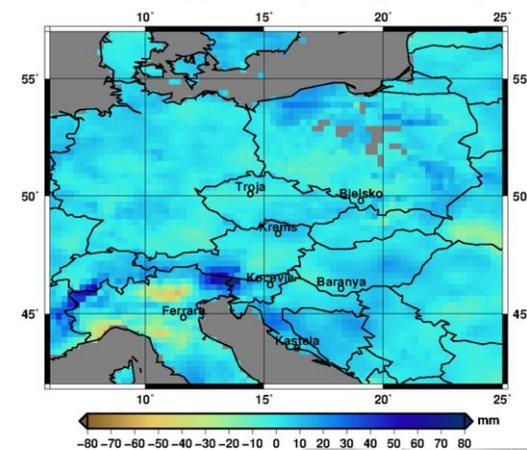
EOBS R20mm [1987-2016] minus [1951-1980]



EOBS R99p [1987-2016] minus [1951-1980]



EOBS Rx5day [1987-2016] minus [1951-1980]



D.T1.2.2
D.T1.2.3

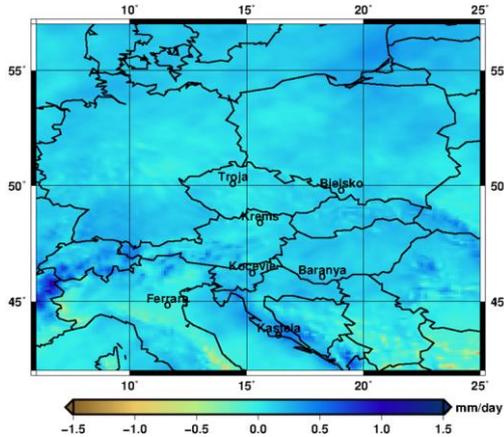


ELABORATION OF MAPS WITH HOT SPOTS OF EXTREME POTENTIAL IMPACTS ON CH

in (2021-2050) wrt (1976-2005)

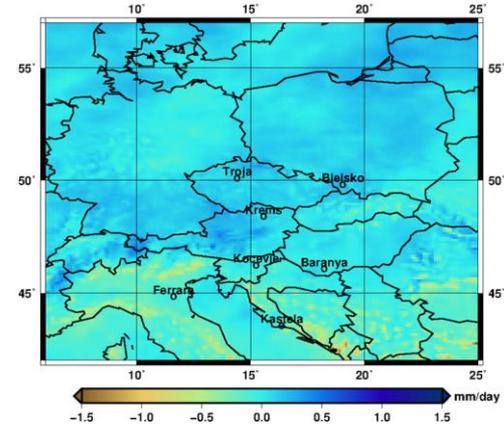
in (2071-2100) wrt (1976-2005)

MPI-ESM-LR-RCA4 RR [2021-2050]-[1976-2005] RCP4.5

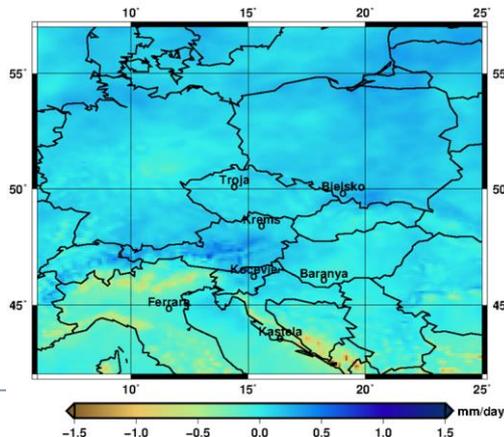


RCP 4.5

MPI-ESM-LR-RCA4 RR [2071-2100]-[1976-2005] RCP4.5

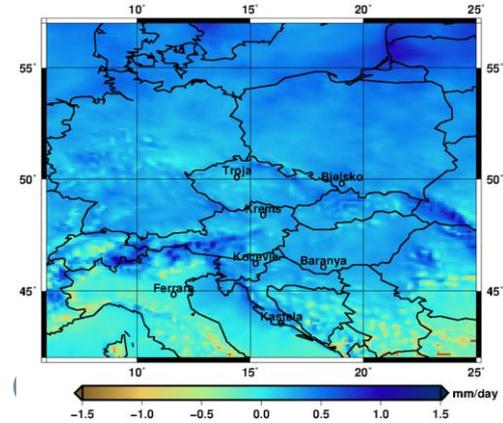


MPI-ESM-LR-RCA4 RR [2021-2050]-[1976-2005] RCP8.5



RCP 8.5

MPI-ESM-LR-RCA4 RR [2071-2100]-[1976-2005] RCP8.5



Changes in precipitation in Central Europe:

D.T1.2.2
D.T1.2.3



TAKING I

Data source: RCA4 RCM (Euro-CORDEX)

PROTECHT2SAVE WEB GIS TOOL FOR RISK MAPPING



RISK ASSESSMENT AND SUSTAINABLE PROTECTION OF CULTURAL HERITAGE IN CHANGING ENVIRONMENT

Disasters and catastrophes pose risks not only to the conservation of cultural heritage assets with its cultural, historic and artistic values, but also to the safety of visitors, staff and local communities. Additionally, they cause undoubtedly negative consequences for the local economies.

Activities

The **ProteCHt2save** project contributes to an improvement of capacities of

Main expected results

ProteCHt2save will deliver ICT solutions (web-based inventory and maps) and tools (decision support tool, best practices manual, handbook on transnational rescue procedures) for risk management and protection of cultural heritage in central Europe. Pilot actions will test the approach and tools in risk prone areas and areas with cultural heritage vulnerabilities to improve the existing disaster risk management plans and policies in municipalities.



ON LINE DEMO....

