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Multi-Index Drought Assessment in Europe

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water
MDPI

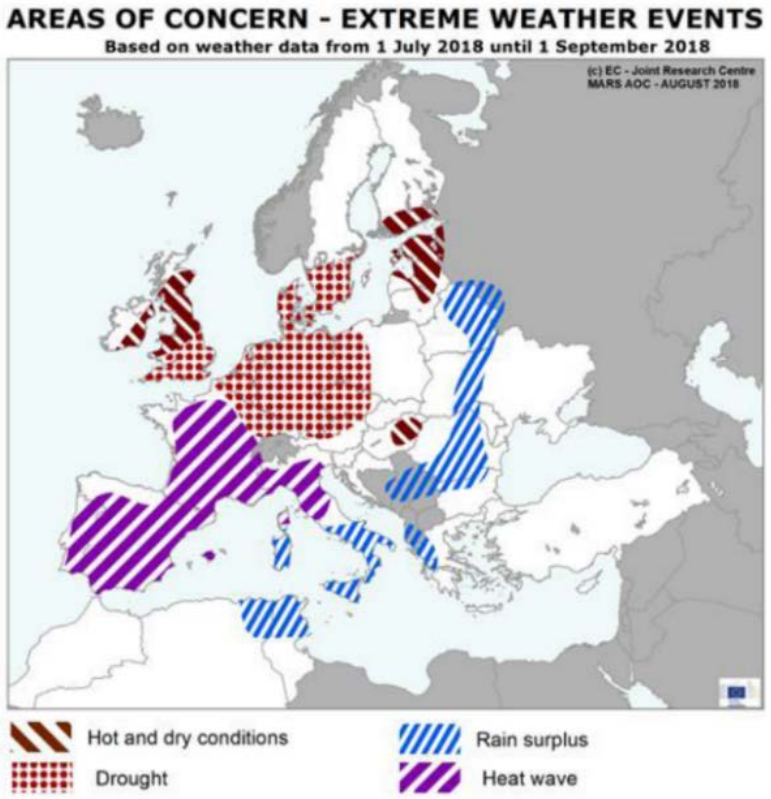
Introduction

- Drought is a normal climatic phenomenon, and its recurrence is inevitable.
- Drought is a combination of natural events that many times is boosted by anthropogenic pressures.
- Drought indicators are conveying objective information about a system's status that may aid decision makers to identify:
  - Onset
  - Magnitude
  - Duration

Introduction

- SPI and SPEI offer a very well tested and dependable combination of indicators.
- In southern Europe winter droughts are crucial, whereas in northern Europe the summer ones are most impactful.
- Drought events have regularly occurred all over Europe and particularly in the last fifty years.
- Last fifty years, drought has cost more than 100 billion € at EU level.

Weather Situation in Europe during July & August 2018

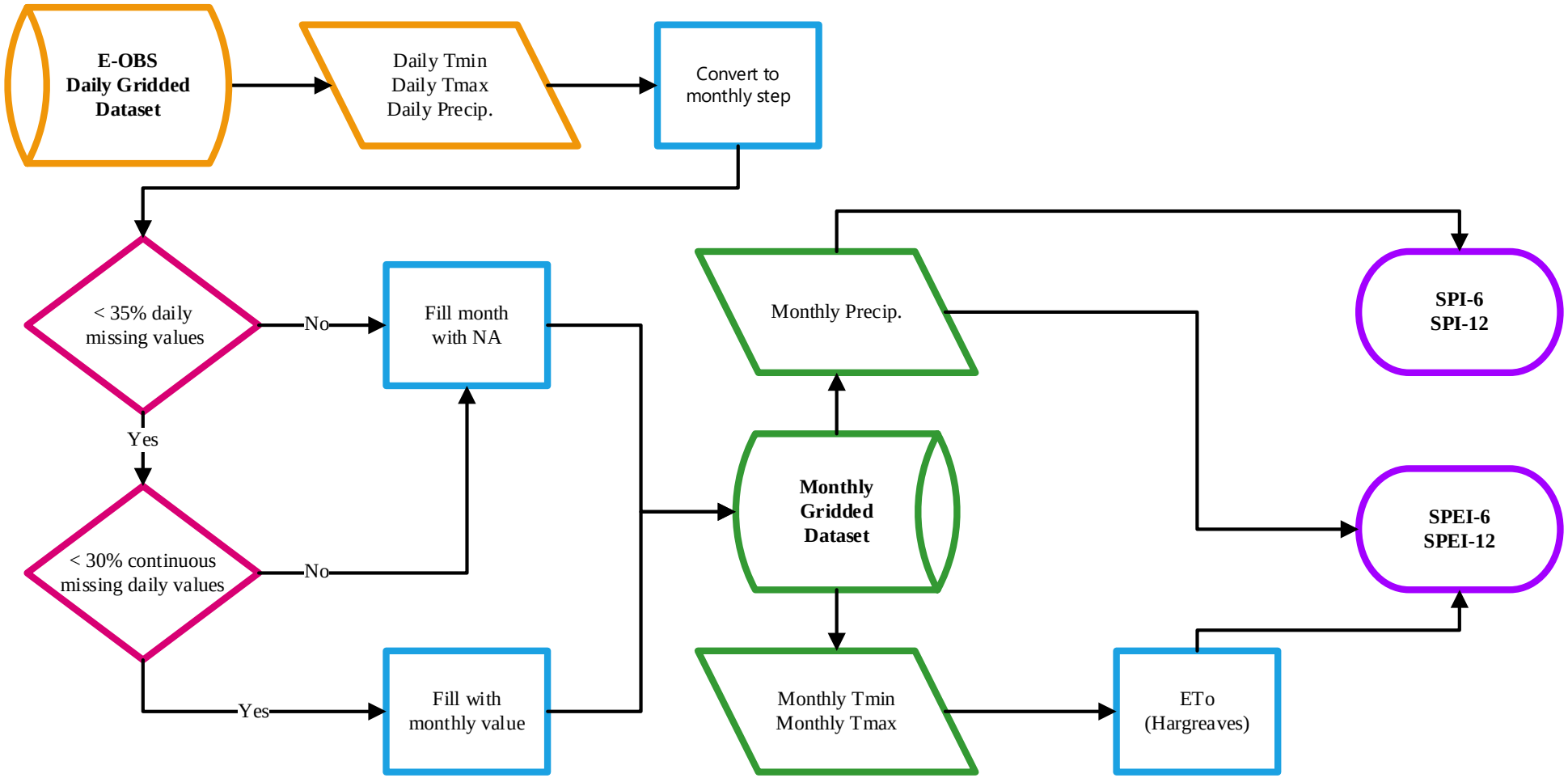


Source: DG AGRI, 2018

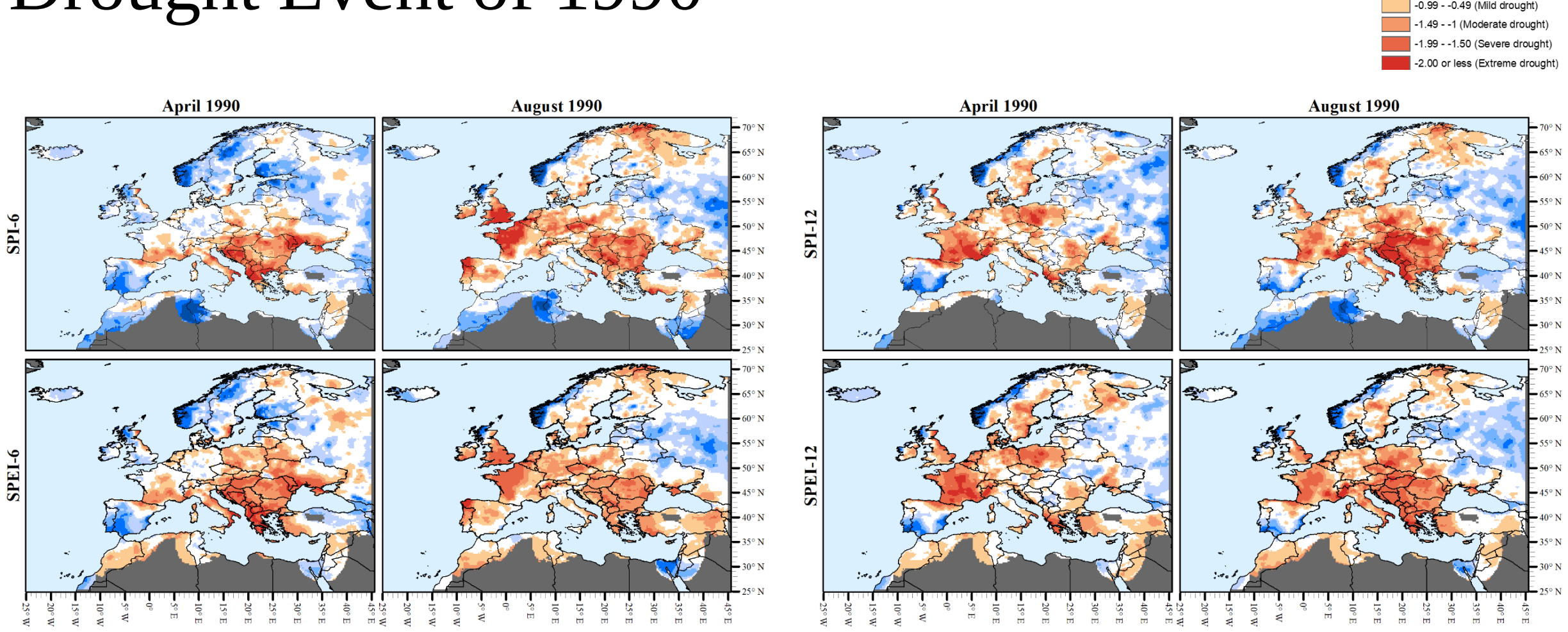
Materials & Methods

- E-OBS gridded dataset (ensemble version)
- Resolution: 0.25 deg. regular grid
- Period: 1969-2018
- Parameters
  - daily min. temperature
  - daily max. temperature
  - daily precipitation sum

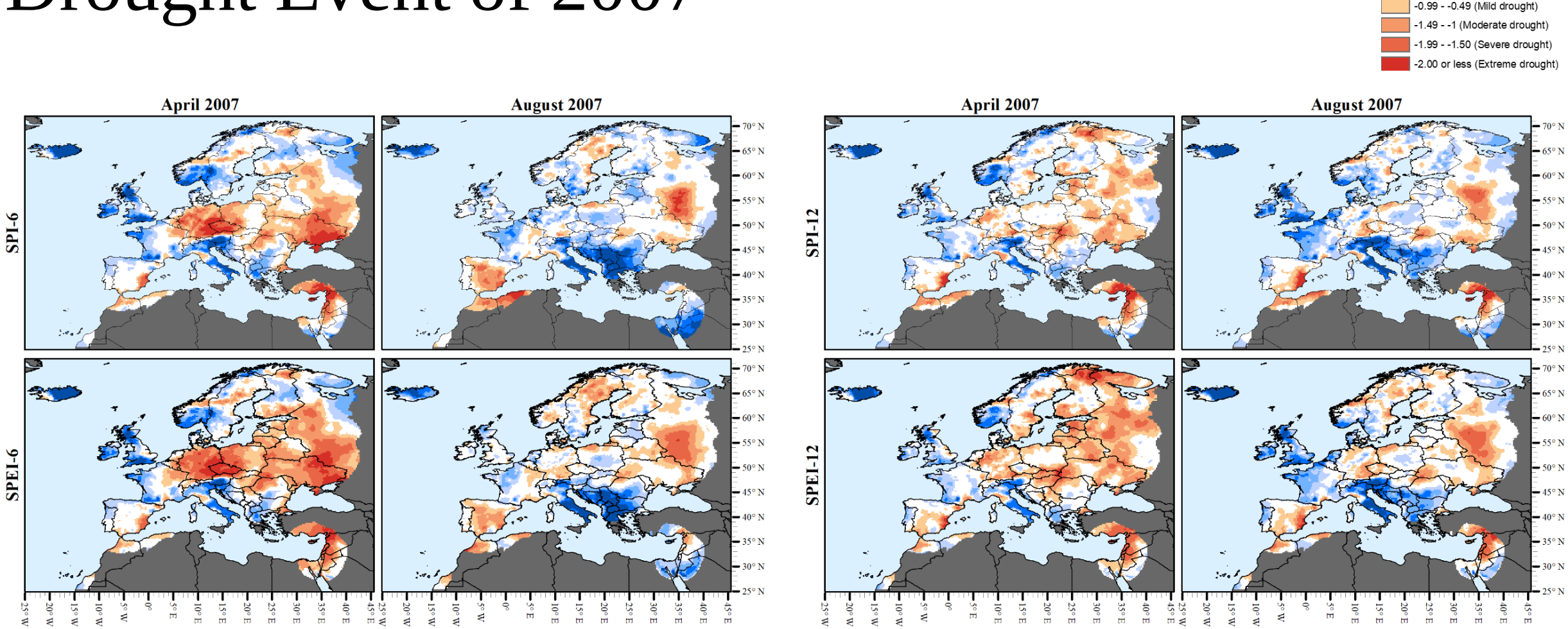
Materials & Methods



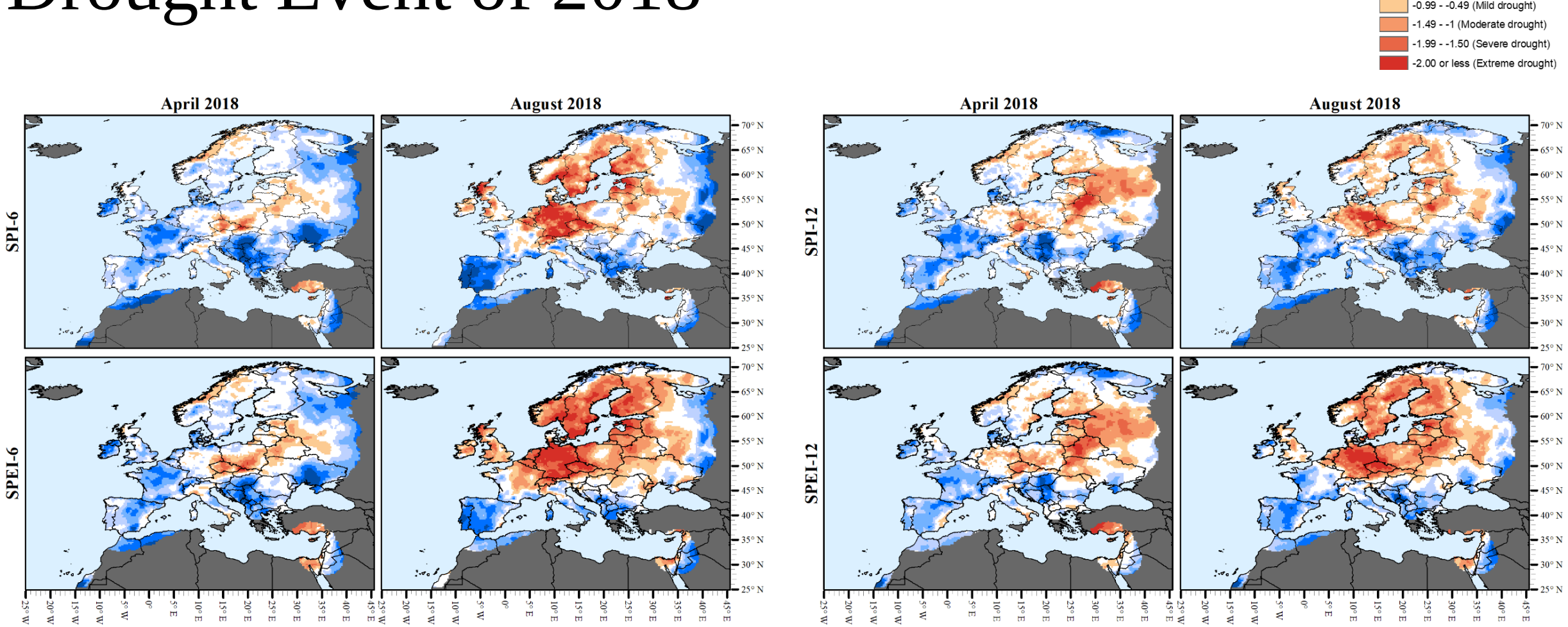
Drought Event of 1990



Drought Event of 2007



Drought Event of 2018



Conclusions

- The application of SPI and SPEI clearly depicts drought events all over Europe with two distinct zones, the Mediterranean and the Northern one beyond the Alps.
- SPEI captures the main impact of increased temperatures on vegetation water demand, which most of the times is more pronounced than SPI.
- The comparison indicated that 1990 drought event was the greatest on record.
- Both indices offer an initial assessment on drought critical areas and comparability, towards contingency planning implementation for timely and effective mitigation efforts.