The Copernicus Climate Change Service (C3S)

Climate Change

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Copernicus
Europe's eyes on Earth

European Commission | ECMWF

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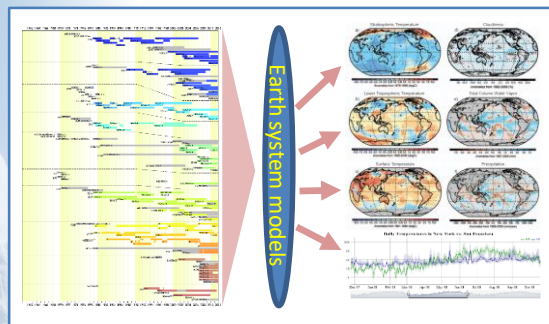To support European adaptation and mitigation policies by:

- Providing consistent and authoritative information about climate (past, present, future)

- Building on existing capabilities and infrastructures (nationally, in Europe and worldwide)

- Stimulating the market for climate services in Europe
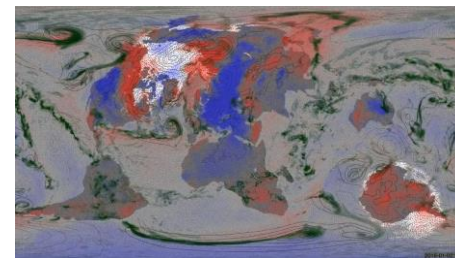
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Observations, climate data records and climate Reanalyses

Courtesy: Philip Brohan

Seasonal forecast data and products

Climate model simulations

Sectoral climate impact indicators

http://climate.copernicus.eu
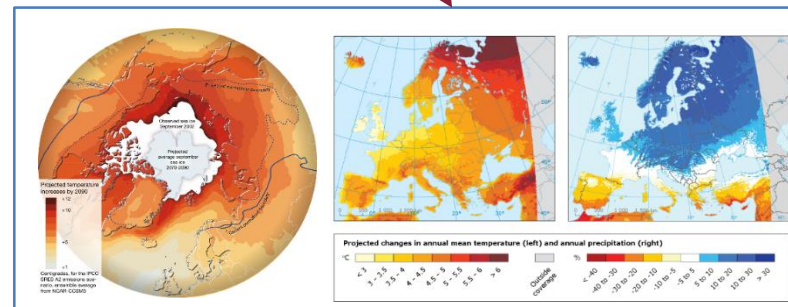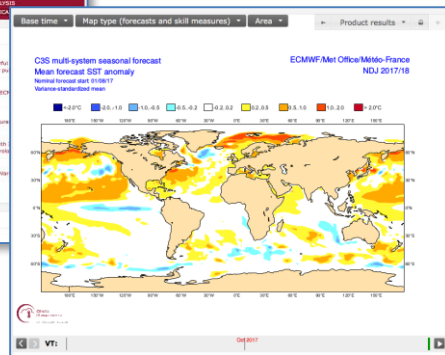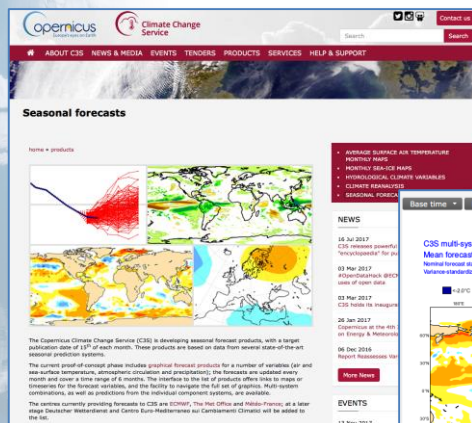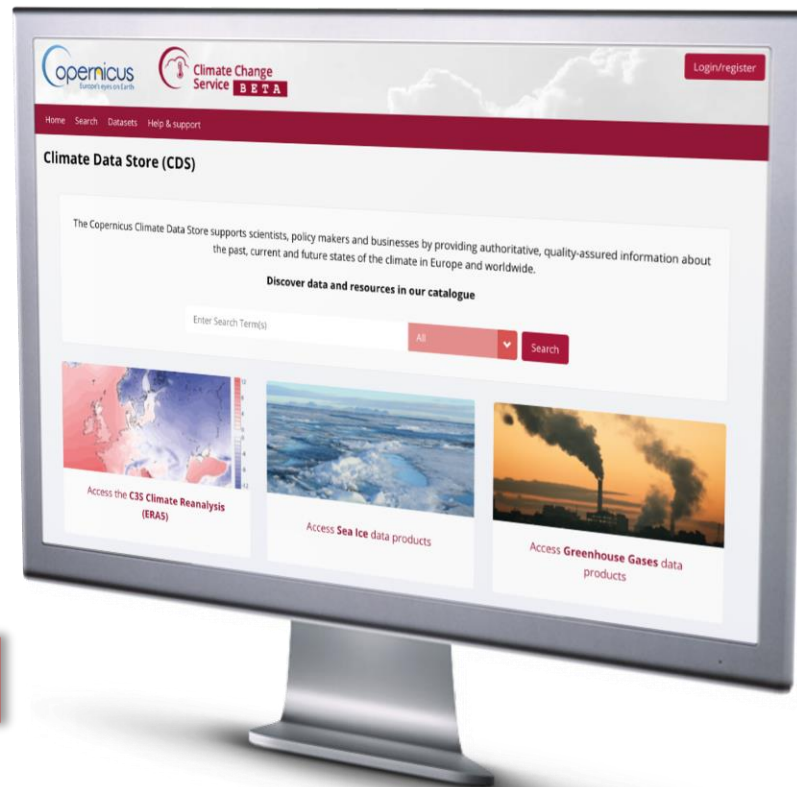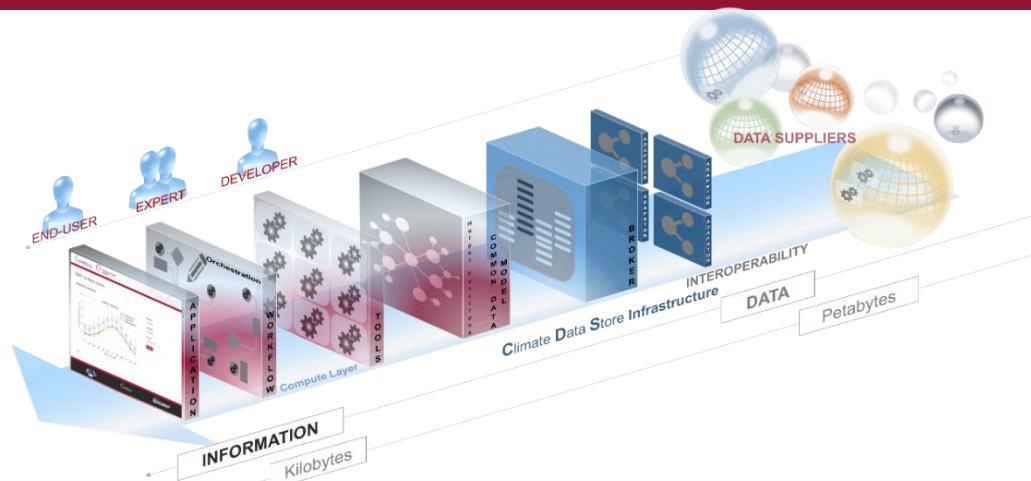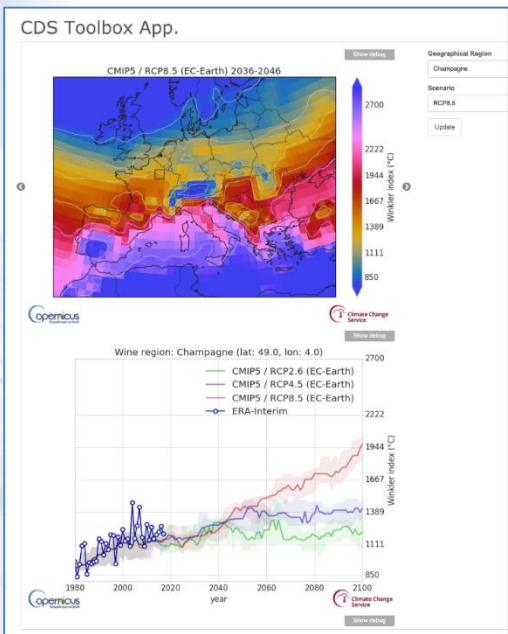
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- Access to climate data

- Tools needed to use the data

- Information on sectoral impacts

- Quality assurance

- User support and training

- Climate change assessments

- Outreach and communication
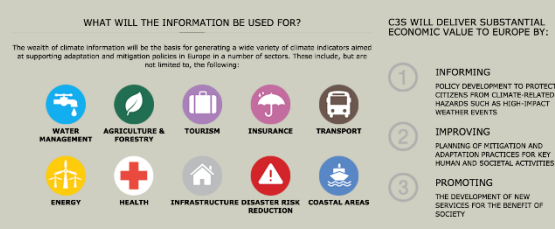
A one-stop Climate Data Store

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CDS Toolbox App.

The CDS and its Tool Box allows managing and handling "climate objects" in a seamless way and within a unified environment.

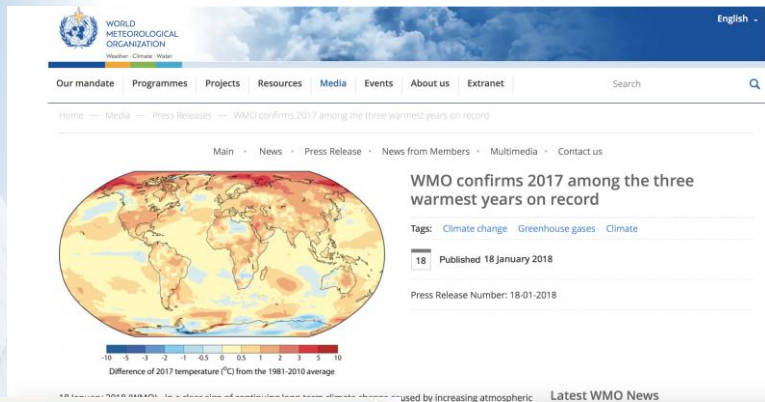Sectoral Information System

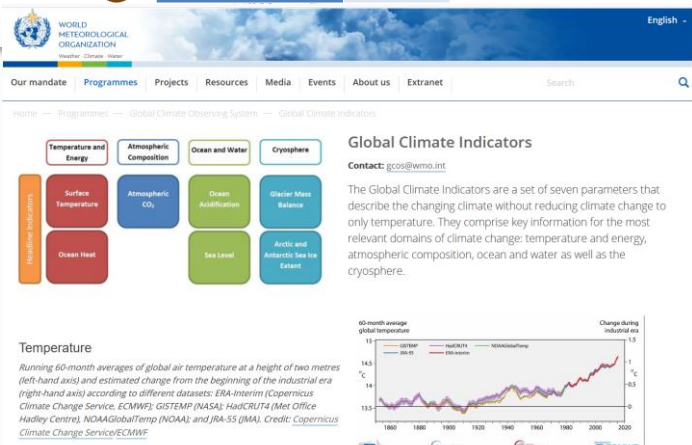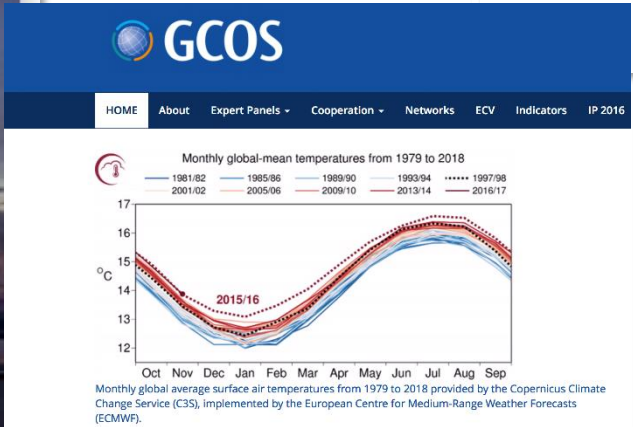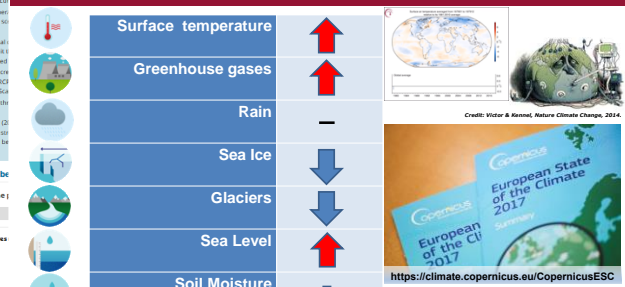Climate Change

WMO confirms 2017 among the three warmest years on record

Global and European temperature

C3S: Operational production of climate indicators

WMO Statement on the State of the Global Climate in 2017

GCOS

Global Climate Indicators

Climate

C3S contribution to SDGs

2 ZERO HUNGER	C3S SIS addresses agriculture, and some of the global services will focus on food security
3 GOOD HEALTH AND WELL-BEING	C3S SIS addresses health, providing relevant climate change indicators
6 CLEAN WATER AND SANITATION	Two Proof-of-concept SIS projects in C3S dedicated to water management. A urban PoC SIS is also addressing this SDG at city level. Migrated to Operations
7 AFFORDABLE AND CLEAN ENERGY	Two proof-of-concept SIS projects in C3S dedicated to the Energy Sector. Reanalyses (produced by C3S) are also highly relevant. Migrated to Operations
8 DECENT WORK AND ECONOMIC GROWTH	C3S activities contribute indirectly to this SDG insofar that the energy climate impact indicators (see goal 7) are relevant.
9 INDUSTRY, INNOVATION AND INFRASTRUCTURE	C3S is working closely with the standardisation community (via DG-CLIMA) on developing climate change information required for the writing of standards in infrastructure and transport.

C3S contribution to SDGs

11 SUSTAINABLE CITIES AND COMMUNITIES	C3S SIS related to urban aspects of climate change, as well as health and infrastructure aspects, contribute indirectly to this SDG. Reanalysis products too.
12 RESPONSIBLE CONSUMPTION AND PRODUCTION	C3S SIS products and indicators on water management are directly relevant for this goal.
13 CLIMATE ACTION	ECV products, including from reanalysis, CDRs, seasonal forecasts and climate scenarios, directly relevant for adaptation. The SIS also delivers relevant indicators in support of adaptation. Cooperation: EEA Climate ADAPT
14 LIFE BELOW WATER	Some of the ECV products generated by C3S (including reanalysis ORAS5) are ocean relevant. This is done in coordination with CMEMS. SIS on shipping highly relevant
15 LIFE ON LAND	Biodiversity is a sectoral application of C3S. Relevant products contribute to this goal. ECV products on soil moisture, forestry, lakes, also contribute to this goal.

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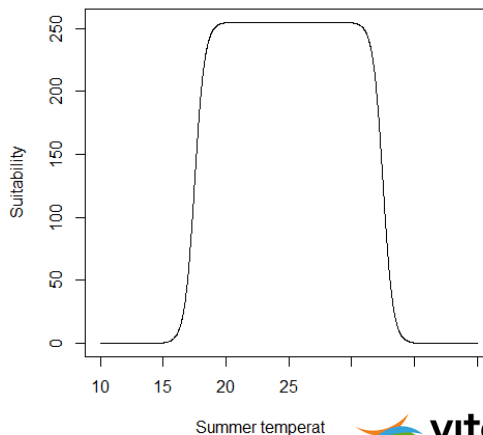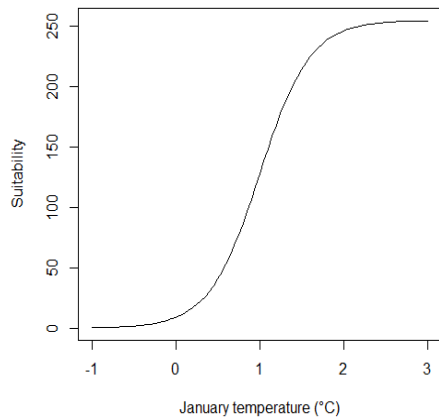**3 GOOD HEALTH AND WELL-BEING**

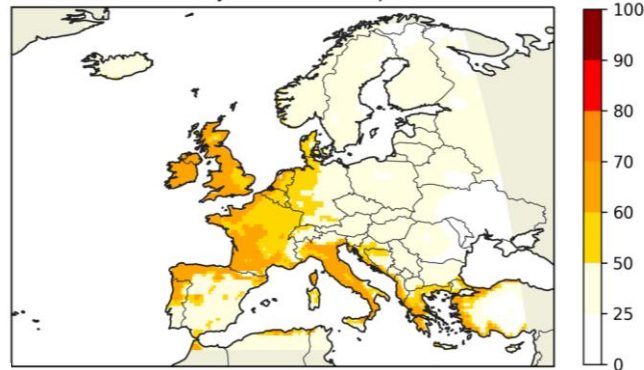Breed in water in holes e.g. car tyres → Travel with containers on ships → Arrive in harbor

Disease outbreaks such as dengue ← Ideal habitat + Ideal climatic conditions in city close to harbor
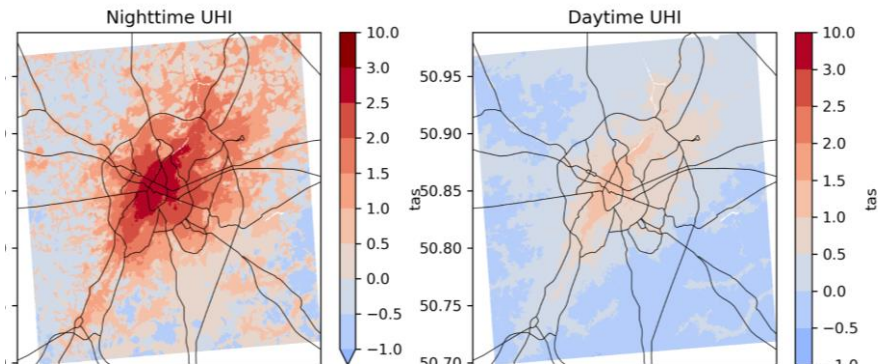

Suitability for Aedus albopictus

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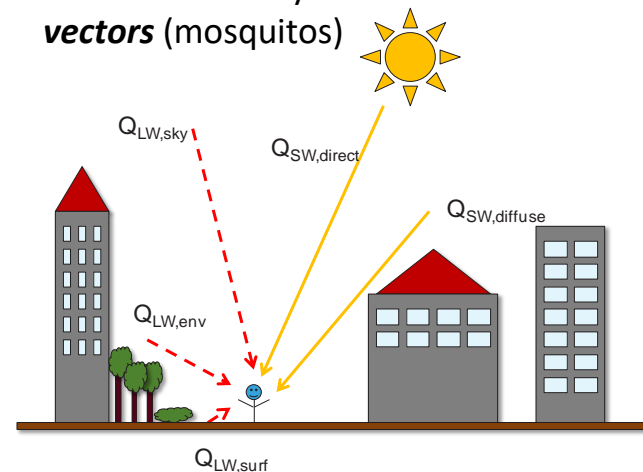**Brussels UHI-effect**

Nighttime UHI

Daytime UHI

C3S Urban Climate Data

- Forced by large-scale climatology from C3S CDS (ERA5, 2008-2017)
- 100 m spatial resolution, hourly values
- Available from CDS catalogue (spring 2019)

- Urban heat island enhances exposure of humans to **heat stress** during heat waves
- Higher temperature mininima enhance habitat suitability of certain **disease vectors** (mosquitos)


$Q_{LW,sky}$

$Q_{SW,direct}$

$Q_{SW,diffuse}$

$Q_{LW,env}$

$Q_{LW,surf}$

VITO ECMWF Copernicus Europe's eyes on Earth European Commission

C3S_422_Lot1_WEnR

4 data product groups:

1. Climate forcing data for crop models
   - all time scales, downscaled, bias corrected, adaptors

2. Water based indicators
   - Soil moisture, groundwater recharge, reservoir inflow, river flow, ET, SPI, ...

3. Agroclimatic indicators (crop specific + generic)
   - Growing degree days, huglin index, cold/heat stress days, insect flight index, ...

4. Climate enhanced EarthObservation based indicators
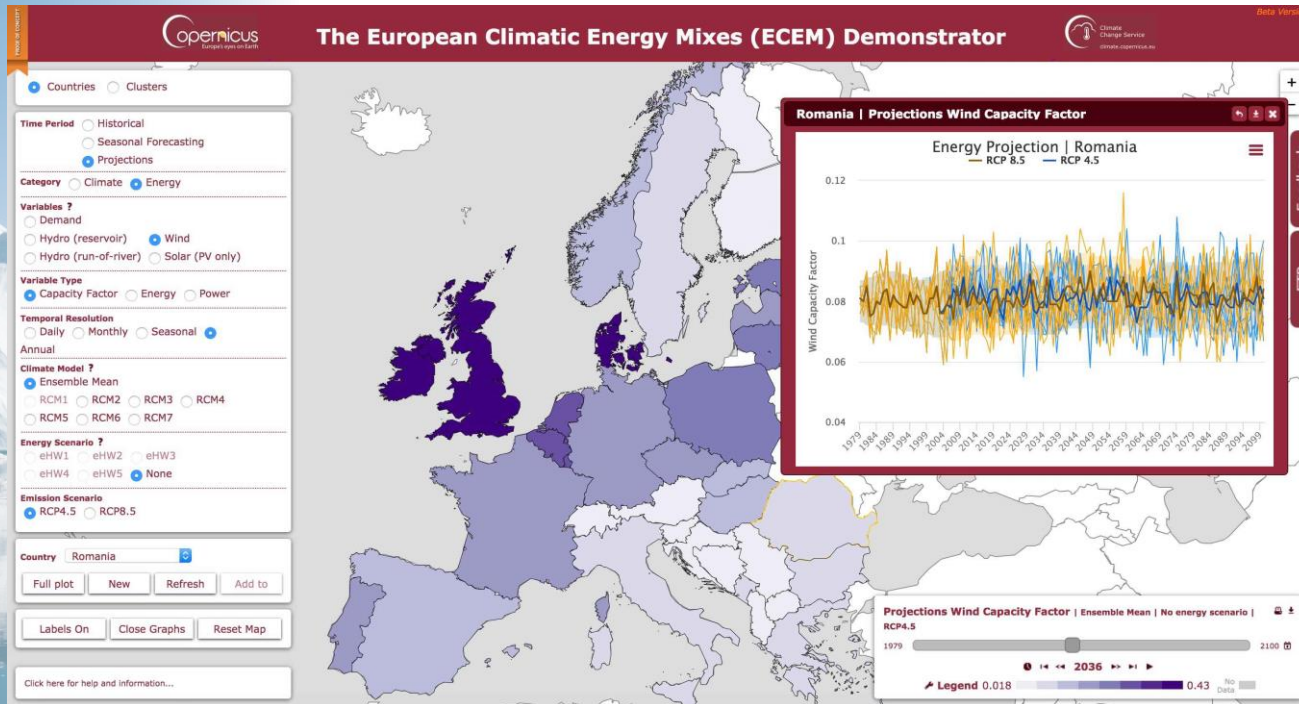   - Dry Matter Productivity (crop specific), ET_{actual}, ...
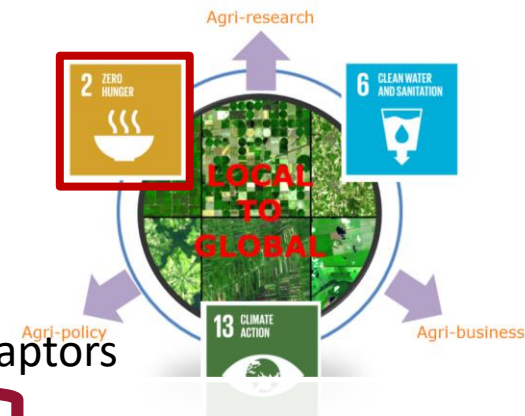
All aggregated to crop specific
- phenological calendars
- growing areas

The C3S ECEM Demonstrator:
An online interactive tool to test energy mixes

http://ecem.wemcouncil.org

https://www.youtube.com/watch?v=U-w5_sTHqG4

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And more …

(see next talk)