

Multigenerational Legacies of the 1986 Chornobyl Disaster

(10 minutes)

for ICLGMT

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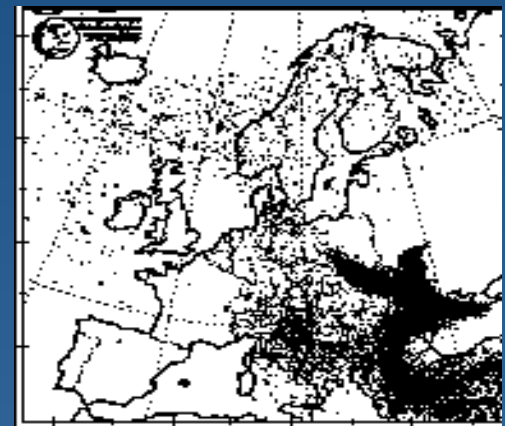
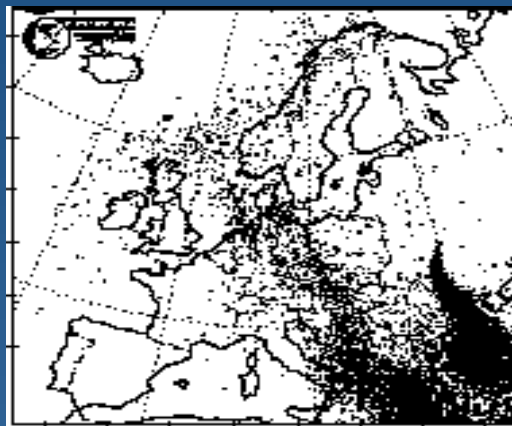
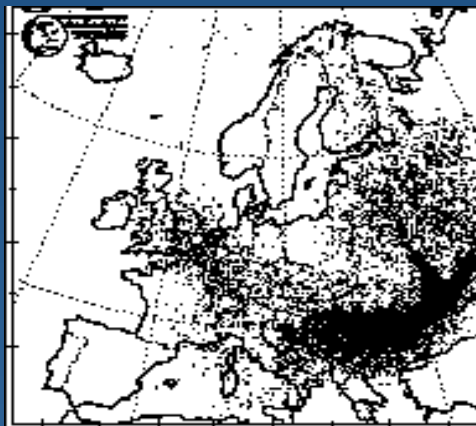
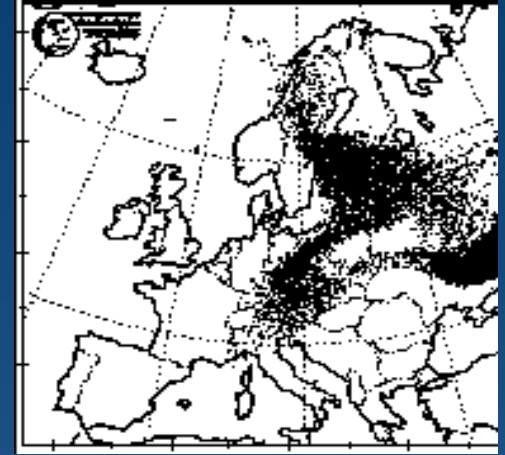
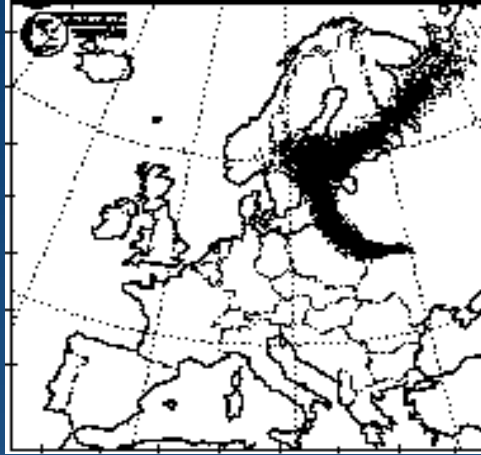
Official quotes

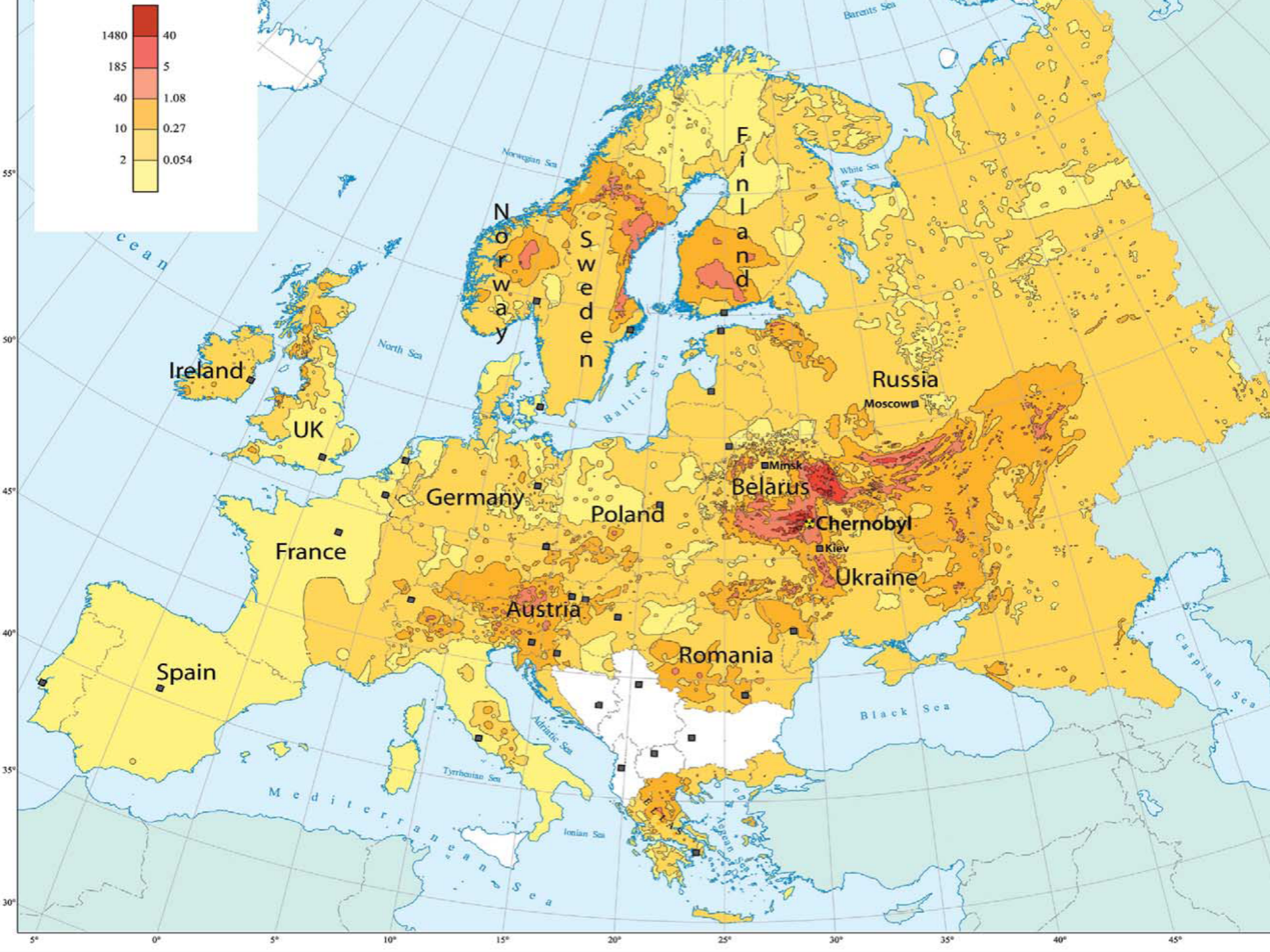
- "...foremost nuclear catastrophe in human history" IAEA (1996)
- "... by far, the worst industrial disaster on record" IAEA/WHO (2005a)
- "Chernobyl radioactivity 200 times that from Hiroshima and Nagasaki" WHO/IPHECA (1995)



Dispersal

source: ARAC, Lawrence Livermore Research Laboratory, California, US (reproduced from OECD (2002))





Main Radionuclides PBq=10¹⁵ Bq

Nuclide	Half-life	Core Inventory April 26 1986	Estimated % Released
Te-129m	33.6 days	1,040 PBq	~23%
Te-132	3.26 days	4,200	~27%
I-131	8.04 days	3,180	~56%
I-133	0.9 days	6,700	37%
Cs-134	2.06 years	150	~36%
Cs-137	30.0 years	260	~33%
Sr-90	29.1 years	220	~5%
Ru-106	1.01 years	850	>9%

Source:

UNSCEAR 2000

Cs-137 Contamination - Area

	% of surface area 4 - 40 kBq/m² Cs-137
Switzerland	85%
Austria	83 %
Czechoslovakia	78 %
Ireland	68 %
Greece	51 %
Norway	49 %
Germany	44 %
Finland	41 %
United Kingdom	34 %
Poland	27 %
Sweden	26 %

Main Radionuclides

- Cs-137 remains worldwide
- Sr-90 remains <100 km
- I-131 important for ~3 months after the explosions
- long-lived alpha-emitters <100 km

EC Commission (2005)

Andris Piebalgs, European Energy Commissioner, written answer to Question P-1234/05DE
by MEP Rebecca Harms - April 4, 2005

“...it is not possible to conclude that there will be any further substantial decrease over the next decades, except due to the radioactive decay of Cs-137 and Sr-90 ...”

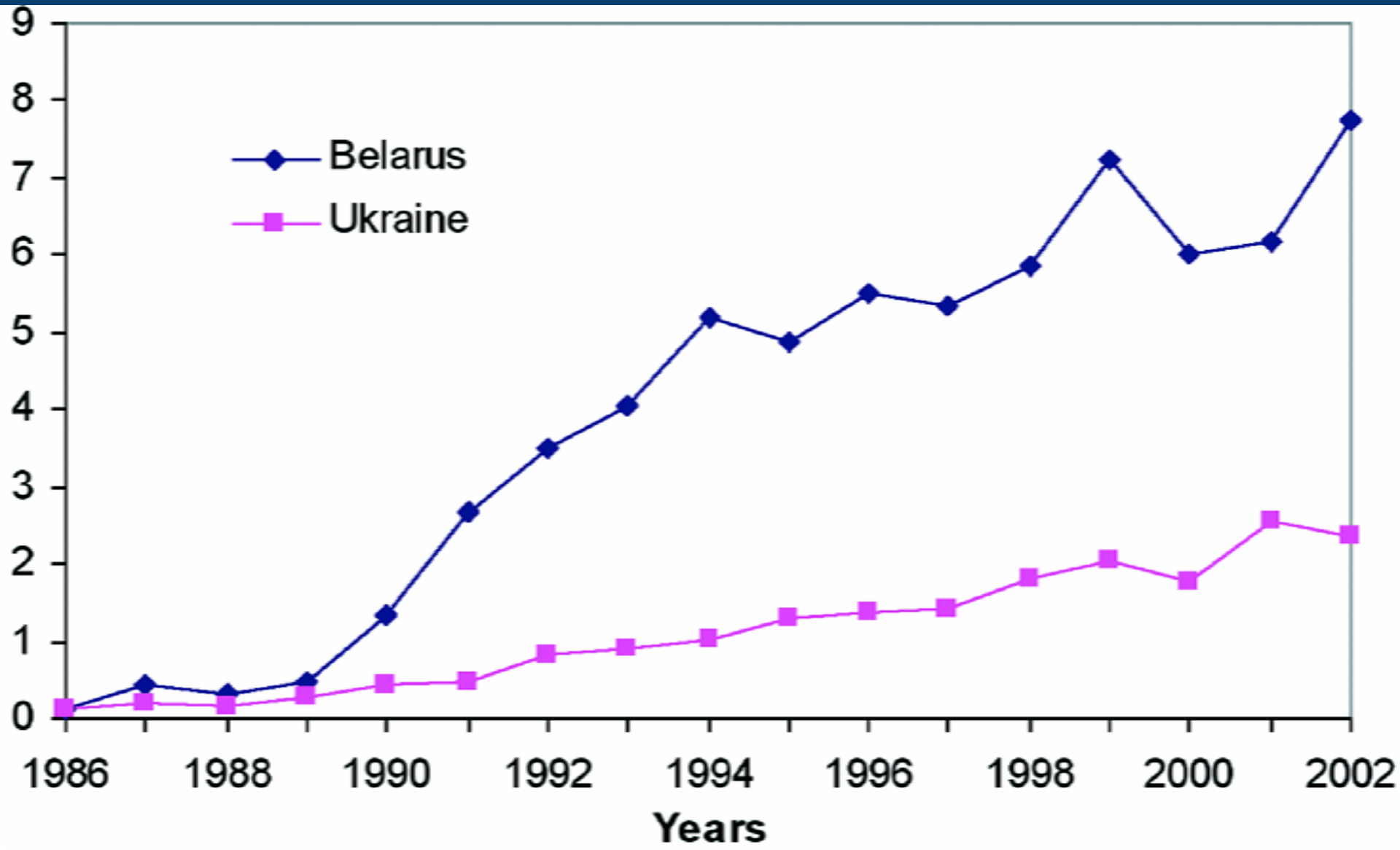
Health Effects

- thyroid cancers
- Leukemias (blood cancers)
- solid cancers
- cardio-vascular effects + strokes
- heritable effects?
- mental health + psychosocial effects

4.3 Thyroid Cancer Epidemic

per 100,000 children and adolescents

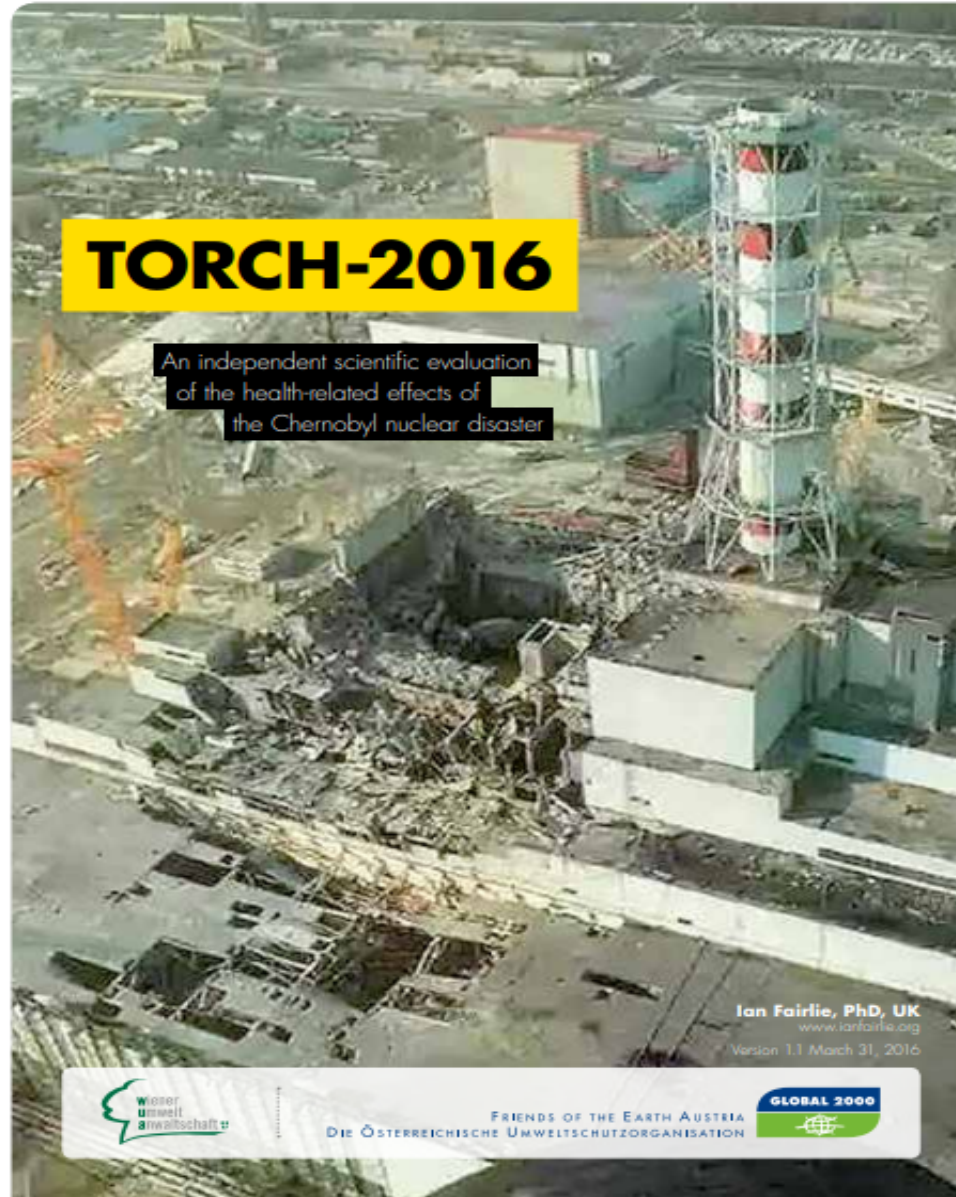
source: Jacob et al (2005)



Mental Health Effects: IAEA/WHO 2005 report

“The magnitude and scope of the Chernobyl disaster, the size of the affected population, and the long-term consequences make it, by far, the worst industrial disaster on record. Chernobyl ... (resulted in) massive relocation, loss of economic stability, and long-term threats to health in current and future generations, that resulted in an increased sense of anomie and diminished sense of physical and emotional balance. It may never be possible to disentangle the multiple Chernobyl stressors from those following in its wake However, the high levels of anxiety and ... physical symptoms continue to this day.”

2016 TORCH Report on Chernobyl



Mental Health Effects -IF

“The Chernobyl accident had profound, far-reaching **psycho-social effects** particularly on the 530,000 cleanup workers, 130,000 evacuees, and 270,000 people living in the highly contaminated areas of Belarus, Ukraine and Russia.”

Mental Health Effects -TORCH

- anxiety about radiation exposures
- extreme pessimism, depression, apathy and fatalism
- feelings of victimhood and of social exclusion
- suicides, due to evacuations/resettlement
(UNDP, 2002)

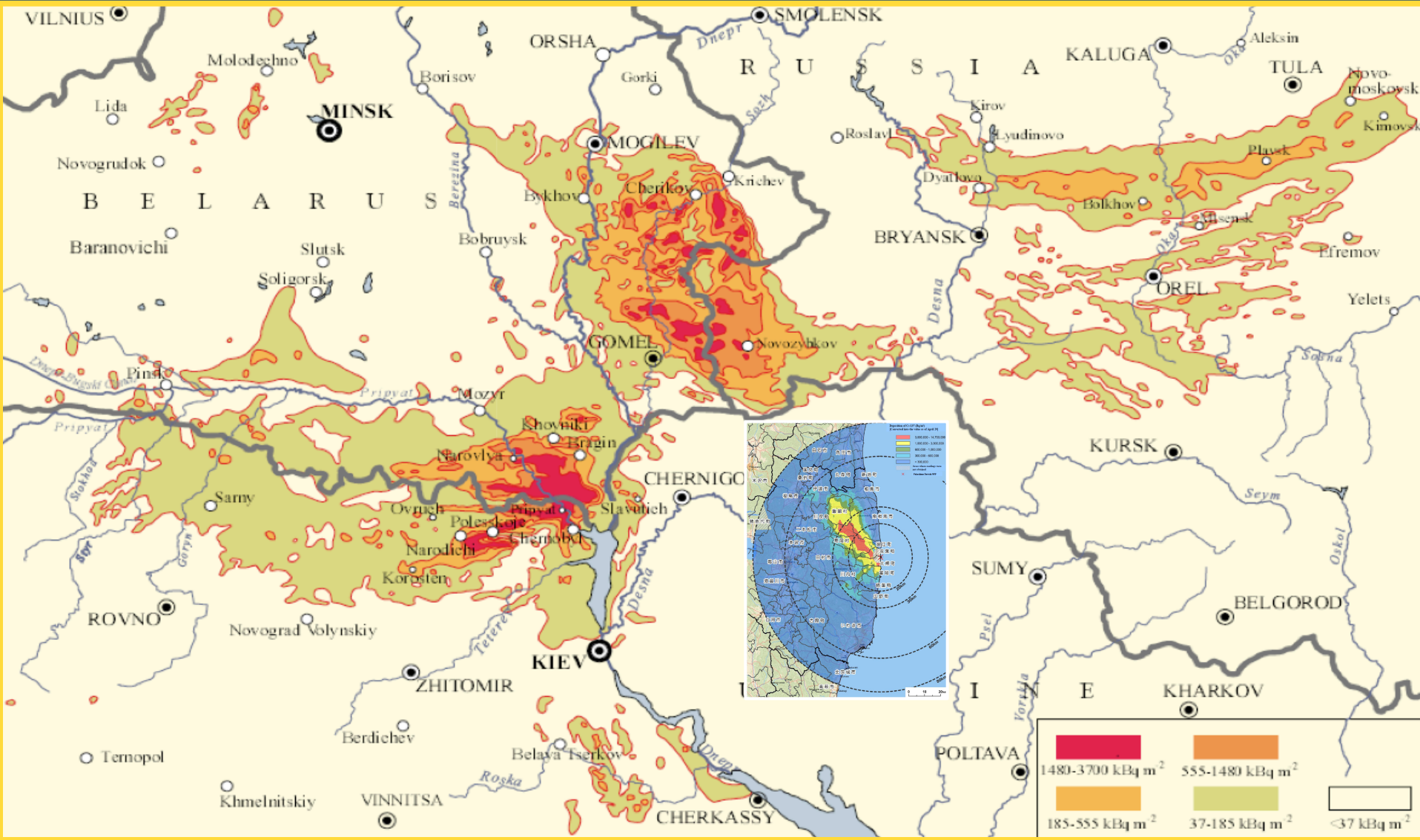
Fukushima: in a Nutshell

- ~140,000 people evacuated: many permanently
- >10,000s of cases of post-trauma stress disorder, depression, anxiety disorders due to evacuations
- 2,000 deaths due to evacuations from ill-health and suicides

- ~5,000 fatal cancers over next 60 years (estimated from UNSCEAR 2012)
- strokes, cardiovascular diseases, thyroid cancers
- 8% of Japan including Tokyo contaminated >10 kBq/m²
- economic losses - between \$300 and \$500 billion

Cs-137 contamination at Chernobyl and Fukushima

two maps are approximately to same scale



Conclusions: Chornobyl

- 40% of Europe contaminated
- 30,000-60,000 cancer deaths
- 18,000-66,000 thyroid cancers in Belarus
- contamination to remain for 100s of years
- serious mental health effects, but few studies
- Prof Kate Brown's book - Manual for Survival (2020)

George Santayana

US philosopher (1863 - 1952)

“...governments unable to learn from history are condemned to repeat it...”

Thanks for listening!

Good report: UNDP (2002) The Human Consequences of
the Chernobyl Nuclear Accident.

A Report Commissioned by UNDP

and UNICEF with the support of UN-OCHA and WHO. United
Nations. New York

United Nations Office for the Coordination of Humanitarian Affairs