

# Supplement

## Natural Hazards and Earth System Sciences

### **A multi-scale risk assessment for tephra fallout and airborne concentration from multiple Icelandic volcanoes - Part II: vulnerability and impact**

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This supplementary material comprises exposure and vulnerability maps and tables produced to compile the tephra impact assessment presented in the article “A multi-scale risk assessment for tephra fallout and airborne concentration from multiple Icelandic volcanoes - Part II: vulnerability and impact” by C. Scaini et al.

Supplementary material is constituted by:

- 1) Table S1. Icelandic municipalities map and identification number
- 2) Table S2. Vulnerable population for municipalities
- 3) Fig. S1. Thematic maps of milk (a) and wool (b) production and percentage of agricultural area (c) for municipalities
- 4) Table S3. List of airports considered for the vulnerability assessment of European airspace
- 5) Fig. S2. Thematic maps of air traffic and multi-modal accessibility values for European Nuts-2 regions: passengers (a) and freight (b), population (c) and multi-modal accessibility (d).
- 6) Fig. S3. Impact maps for FIRS produced at FL150 (top) and 300 (bottom) in case of occurrence of the considered eruptive scenarios: Hekla-2000 (a), Hekla-1947 (b), Katla-1918 (c) and Askja-1875 (d).

**1) Table S1. Icelandic municipalities map and identification number**

<b>Name</b>	<b>ID</b>
Borgarfjararhreppur	7509
Breidalshreppur	7613
Bahreppur	7611
Djúpavogshreppur	7617
Fskrsfjarahr.	7610
Fjarðabyggð	7300
Fljtsdalshreppur	7505
Mjafjararhreppur	7605
Seyðisfjörður	7000
Stvarhreppur	7612
Sveitarflagi Hornafjrur	7708
Vopnafjarðarhreppur	7502
Tjörneshreppur	6611
Pingeyjarsveit	6612
Svalbarðsstrandarhreppur	6601
Grytubakkahreppur	6602
Skútustaðahreppur	6607
Aðaldælahreppur	6609
Akureyri	6000
Arnarneshreppur	6506
Dalvíkurbyggð	6400
Eyjafjarðarsveit	6513
Grmseyjarhreppur	6501
Grtubakkahreppur	6602
Hrseyjarhreppur	6504
Arnarneshreppur	6506
Norðurþing	6100
Sktustaahreppur	6607
Svalbarshreppur	6706
Tjrneshreppur	6611
Bessastaahreppur	1603
Garabr	1300
Hafnarfjrur	1400
Kjsarhreppur	1606
Kpavogur	1000
Mosfellsbær	1604
Reykjavk	0000
Akrahreppur	5706
Blönduós	5604
Húnavatnshreppur	5612
Skagabyggð	5611
Hfahreppur	5609
Húnaþing vestra	5508

Sveitarflagi Skagafjörður	5200
Ásahreppur	8610
Grmsnes-og Grafningshreppur	8719
Hrunamannahreppur	8710
Hverageri	8716
Mýrdalshreppur	8508
Ölfus	8717
Skaftárhreppur	8509
Sveitarflagi rborg	8200
Uten navn	9999
Vestmannaeyjar	8000
Vestmannaeyjar	8000
Grindavk	2300
Reykjanesbr	2000
Sandgeri	2503
Vatnsleysustrandarhreppur	2506
Arneshreppur	4901
Bæjarhreppur	4908
Bolungarvík	4100
Ísafjarðarbær	4200
Kaldrananeshreppur	4902
Reykhólahreppur	4502
Súðavíkurhreppur	4803
Vesturbyggð	4607
Akranes	3000
Borgarfjararsveit	3510
Dalabyggð	3811
Eyja-og Miklaholtshreppur	3713
Eyrarsveit	3709
Helgafellssveit	3710
Hvalfjararstrandarhreppur	3501
Kjósarhreppur	1606
Skorradalshreppur	3506
Hvalfjarðarsveit	3511
Borgarbyggð	3609
Snæfellsbær	3714
Hvtrshreppur	3601
Innri-Akraneshreppur	3503
Leirr-og Melahreppur	3504
Saurbjarhreppur	3809
Skilmannahreppur	3502
Skorradalshreppur	3506
Snfellsbr	3714
rshafnarhreppur	6709
Austur-Hra	7620
Siglufjrrur	6250
Hörgárbyggð	6514

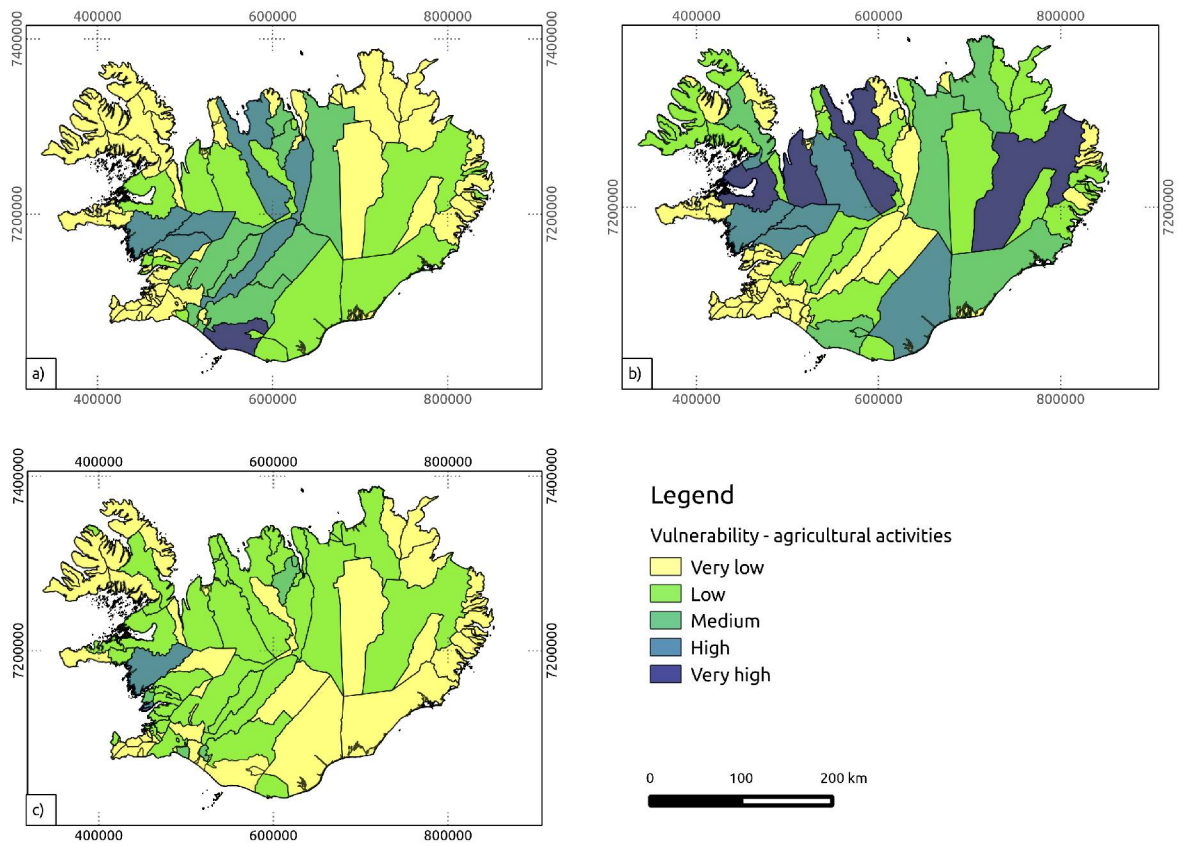
Broddaneshreppur	4911
Kolbeinsstaahreppur	3609
Grímsnes-og Grafningshreppur	8719
Laugardalshreppur	8721
Djprhreppur	8722
Austur-Eyjafjallahreppur	8613
Skeiða- og Gnúpverjahreppur	8720
Holta-og Landasveit	8614
Skagahreppur	5611

**2) Table S2. Table of vulnerable population for municipalities**

<b>Name</b>	<b>Population</b>	<b>% Exposed</b>
Reykjavík	118814	23
Kópavogur	31205	26
Seltjarnarnes	4313	22
Garðabær	13702	25
Hafnarfjörður	26486	24
Mosfellsbær	8854	23
Kjósarhreppur	220	14
Reykjanesbær	14137	24
Grindavíkurbær	2830	13
Sandgerði	1672	23
Sveitarfélagið Garður	1477	23
Sveitarfélagið Vogar	1126	26
Akranes	6592	26
Skorradalshreppur	60	30
Hvalfjarðarsveit	627	20
Borgarbyggð	3740	23
Grundarfjarðarbær	899	21
Helgafellssveit	57	39
Stykkishólmur	1108	26
Eyja- og Miklaholtshreppur	132	20
Snæfellsbær	1737	23
Dalabyggð	686	28
Bolungarvík	889	25
Ísafjarðarbær	3755	24
Reykhólahreppur	271	30
Tálknafjarðarhreppur	276	29
Vesturbyggð	910	23
Súðavíkurhreppur	182	23
Árneshreppur	52	21
Kaldrananeshreppur	104	18
Strandabyggð	516	28
Sveitarfélagið Skagafjörður	4024	24
Húnaþing vestra	1187	25
Blönduóssbær	871	29
Sveitarfélagið Skagatrönd	504	23
Skagabyggð	104	28
Húnavatnshreppur	412	21
Akrahreppur	197	26
Akureyri	17875	25
Norðurþing	2884	25
Fjallabyggð	2035	26
Dalvíkurbyggð	1900	25
Eyjafjarðarsveit	1031	23
Hörgársveit	584	23

Svalbarðsstrandarhreppur	390	22
Grýtubakkahreppur	350	26
Skútustaðahreppur	385	21
Tjörneshreppur	55	22
Pingeyjarsveit	915	27
Svalbarðshreppur	102	20
Langesbyggð	512	28
Seyðisfjörður	677	23
Fjarðabyggð	4600	22
Vopnafjarðarhreppur	670	27
Fljótshreppur	78	13
Borgarfjarðarhreppur	129	19
Breiðdalshreppur	190	23
Djúpavogshreppur	461	25
Fljótshérað	3408	25
Sveitarfélagið Hornafjörður	2143	22
Vestmannaeyjar	4194	22
Sveitarfélagið Árborg	7783	26
Mýrdalshreppur	459	27
Skaftárhreppur	443	25
Ásahreppur	204	22
Rangárþing eystra	1741	25
Rangárþing ytra	1504	23
Hrunamannahreppur	774	24
Hveragerði	2283	26
Sveitarfélagið Ölfus	1930	21
Grímsnes- og Grafningshreppur	416	18
Skeiða- og Gnúpverjahreppur	504	22
Bláskógabyggð	906	22
Flóahreppur	602	22

**3) Fig. S1. Thematic maps of milk (a) and wool (b) production and percentage of agricultural area (c) for municipalities**

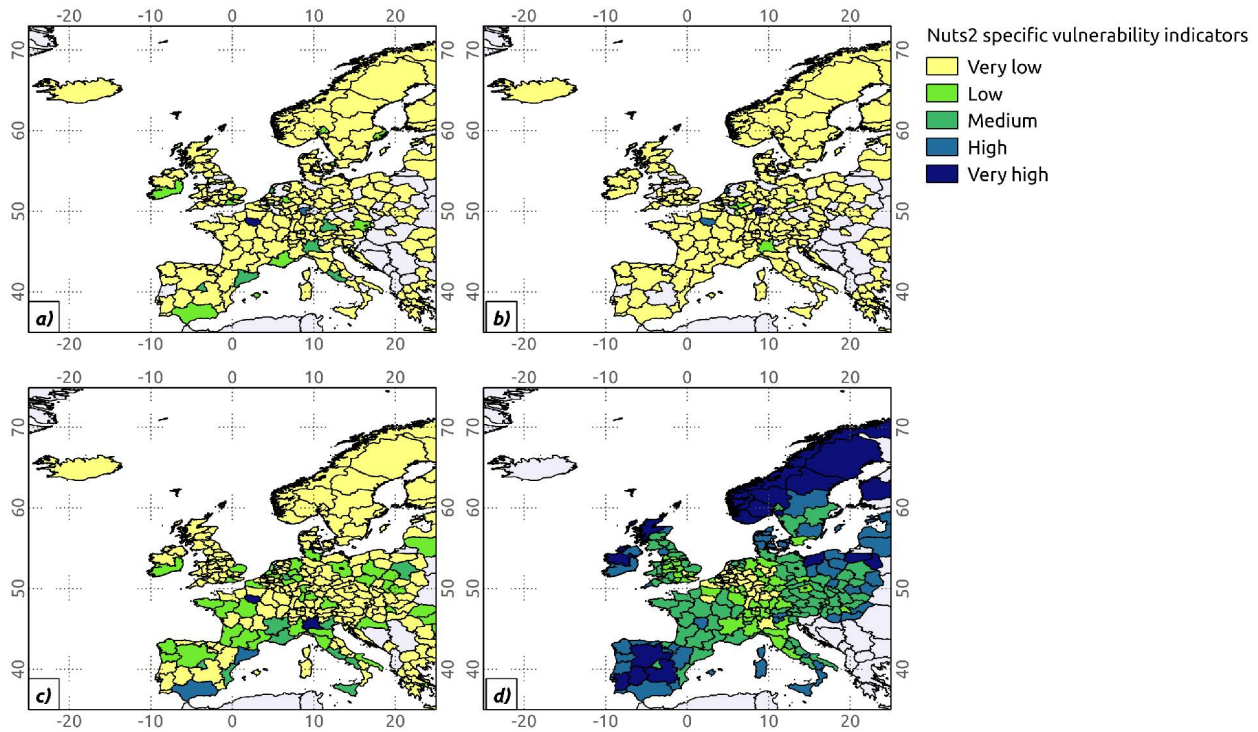




**4) Table S3. List of airports considered for the vulnerability assessment of European airspace**

ICAO CODE	NAME	LON	LAT	YEAR	FREIGHT (tons)	PAX (number)
EHAM	AMSTERDAM SCHIPHOL	4.7642	52.3081	2012	1,510,925	51,107,756
EIDW	DUBLIN	-6.2700	53.4214	2012	111,070	19,090,781
EGPH	EDINBURGH	-3.3725	55.9500	2012	42,938	9,195,305
EDFH	FRANKFURT HAHN	7.2642	49.9483	2012	239,297	2,926,419
EGPF	GLASGOW	-4.4331	55.8719	2012	9,567	7,165,620
EDDH	HAMBURG FUHLISBUETTEL	9.9911	53.6303	2012	28,175	13,715,814
EFHK	HELSINKI- VANTAA	24.9633	60.3172	2012	188,549	14,872,568
BIKF	KEFLAVIK	-22.6056	63.9850	2012	40,030	2,758,847
EDDK	KOELN BONN	7.1428	50.8658	2012	772,552	9,300,160
EGKK	LONDON GATWICK	-0.1903	51.1472	2012	101,096	34,247,481
EGLL	LONDON HEATHROW	-0.4614	51.4775	2012	1,556,219	70,108,071
EGGW	LONDON LUTON	-0.3683	51.8747	2012	29,636	9,621,081
EGSS	LONDON STANSTED	0.2350	51.8850	2012	237,783	17,498,891
EGCC	MANCHESTER	-2.2750	53.3539	2012	98,270	19,819,851
EGNX	NOTTINGHAM EAST MIDLANDS	-1.0792	52.9200	2012	299,994	4,083,919
EKCH	COPENHAGEN KASTRUP	12.6561	55.6181	2012	156,938	23,310,622
ENGM	OSLO GARDERMOEN	11.0839	60.2028	2012	76,326	22,196,044
LFPG	PARIS CHARLES DE GAULLE	2.5478	49.0097	2012	1,510,212	61,648,325
LFPO	PARIS ORLY	2.3794	48.7233	2012	62,830	27,232,130
ESSA	STOCKHOLM ARLANDA	17.9186	59.6519	2012	74,219	19,721,791

5) Fig. S2. Thematic maps of air traffic and multi-modal accessibility values for European Nuts-2 regions: passengers (a) and freight (b), population (c) and multi-modal accessibility (d).



**6) Fig. S3. Impact maps for FIRS produced at FL150 (top) and 300 (bottom) in case of occurrence of the considered eruptive scenarios: Hekla-2000 (a), Hekla-1947 (b), Katla-1918 (c) and Askja-1875 (d).**

