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Spatial and temporal distribution of earthquakes on the Reykjanes Peninsula: their relationship to faults and implications for hazard assessment

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We examine the spatial and temporal distribution of earthquakes on the Reykjanes Peninsula during the last decade and we compare this activity to the distribution of mapped surface faults. We evaluate earthquake activity in four areas from east to west: Bláfjöll, Krísuvík, Grindavík and Reykjanes. Krísuvík, in the central part of the peninsula, experiences high background seismicity associated with a large geothermal field. Background seismicity at Bláfjöll is generally low and at Grindavík and Reykjanes it is moderate to low. The number of earthquakes in Krísuvík and Bláfjöll began to increase in 1997, coincident with a period of intensifying earthquake activity in the Hengill volcanic system at the eastern end of the Peninsula. On 17 June 2000, within minutes of a M 6.6 event in the South Iceland lowland, three magnitude 5 or greater earthquakes occurred on the peninsula, one in Bláfjöll and two in the Krísuvík area. Another M 5 event occurred in Krísuvík in 2003. Since 2000, background seismicity to the west of Krísuvík has increased, while to the east it has decreased, suggesting that the western part of the peninsula might experience an earthquake between M $\geq$5 in the near future. Field evidence and recent mapping from high-resolution digital aerial photographs reveals many faults west of Krísuvík capable of producing M $\geq$5 earthquakes due to strike-slip motion. Seismically, this area has been relatively quiet since the 1970's. However, many damaging earthquakes are known to have occurred on the peninsula in the late nineteenth and early twentieth centuries. We identify sev-

eral faults that might cause damaging earthquakes and we assess the possible seismic hazards to nearby populated areas and infrastructure.