Attracting structures in volcanic ash transport JIFENG PENG,
University of Alaska Fairbanks — Volcanic eruptions and ash clouds are a natural
hazard that poses direct threats to aviation safety. They may also affect human
and ecosystem health. Many transport and dispersion models have been developed
to forecast trajectories of volcanic ash clouds, as well as to plan safety measures.
Predictions based on these models are heavily dependent on initial parameters of
ash clouds, e.g., location, height, particle size and density distribution, water vs. ash
content, etc. However, these initial parameters are usually difficult to determine,
leading to possible inaccurate predictions of ash clouds trajectories. In this study,
a dynamical systems approach is combined with volcanic ash transport models to
help improve prediction. A type of attracting structures in volcanic ash transport
is identified. These structures act as attractors in volcanic ash transport, and they
are independent of initial parameters of specific volcanic eruptions. The attracting
structures are associated with hazard zones with high concentrations of volcanic ash.
And the prediction in hazard maps can be used to plan flight route diversions and
ground evacuations.

Jifeng Peng
University of Alaska Fairbanks

Date submitted: 07 Aug 2009   Electronic form version 1.4