The appearances of meteorite streams

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Motivation

- Meteorites are interesting natural events all the time, which could have significant influence on human civilization as well.
- work on meteorite cataloguing, gathering reports based on “Song Shi” (960AD – 1279AD), “Yuan Shi” (1271AD - 1368AD) and “Ming Shi” (1368AD – 1644AD) in China
The histogram of the 1-year event rate distribution

meteors data is from SonotaCo; fireball data is from NASA.
Meteor stream

• one meteor shower is one meteor stream
  – Quadrantids (Williams et al., 1979; Mcintosh, 1990)
  – Perseid (Lindblad & Porubčan, 1994; Brown & Jones, 1998)
  – Leonid (Yeomans, 1981; Asher, 1999)
  – Geminids (Plavec, 1950; Williams & Wu, 1993)
Moving Average

\[ f(x) = \frac{1}{2n + 1} \sum_{k=x-n}^{x+n} p_k \]
Fireball streams

• 57% of the fireball streams are associated with meteor showers (Terentjeva, 1989).

• a substantial fraction of the fireballs (Porubčan & Gavajdová, 1994)
  – special fireball streams;
  – members of the known meteoroid streams.

• Associations between fireball streams and asteriods (Gavajdová, 1995)
– the blue line is average daily occurrence frequency
– the red and green lines are 1σ and 2σ levels
Official history books

- “Song Shi” (宋史) : The history of Song dynasty during 960AC to 1276AC.
- “Yuan Shi” (元史) : The history of Yuan dynasty during 1271AC to 1368AC.
- “Ming Shi” (明史) : The history of Ming dynasty during 1368AC to 1644AC.
Meteorite stream

- green line is 2σ level
Concussion

• An asteroid make meteorite stream
  – two main peaks in Fig(3b)
  – a wide window in Fig(1b); meteors is cleaned by meteorite stream
THANKS FOR LISTENING