Asteroid Impacts

Kevin Walsh





Yucatan Peninsula, Mexico

Chelyabinsk, Russia





What was this?

What was this? Where did it come from?

What was this? Where did it come from? How often does this happen?









Mars & Jupiter







(253) Mathilde



(243) Ida

Dactyl

(243) Ida

Near-Earth Asteroids

Near-Earth Asteroids



(25143) Itokawa

Exit Routes

Impacts into planets Ejection from the solar system

Lifetime ~ 10 Myr

gravity + sunlight

Gravity

(this will get chaotic)







Sunlight

(lots of small pushes)







re-emission of absorded raditation



retrograde rotation = orbit shrinks

asteroids are mobile!



Impacts

(when push comes to shove)

Siberia 1908





Barrizona, 50,000 years ago





Canada, 215 million years ago Manicouagan







Current efforts to find NEOs

VS DO













OSIRS-REX (SIR)

Bringing back a sample



Orbital Uncertainty for NEA 1950 DA in 2880

Change in Orbit intersection Time

Galactic Tides	10 min
Numerical error	12 min
Solar Mass loss	16 min
Solar Oblateness	49 min
Perturbations from 61 largest asteroids	1.2 days
Planetary Mass Uncertainty	1.3 days
Solar Radiation Pressure	9.1 days
Yarkovsky Effect	57.7 days

Possible means for hazard mitigation

