

Preliminary quantification of potential carcinogens uranium and lead in soil, hair and teeth samples of people living close to gold mine slimes dams west and south-west of Johannesburg

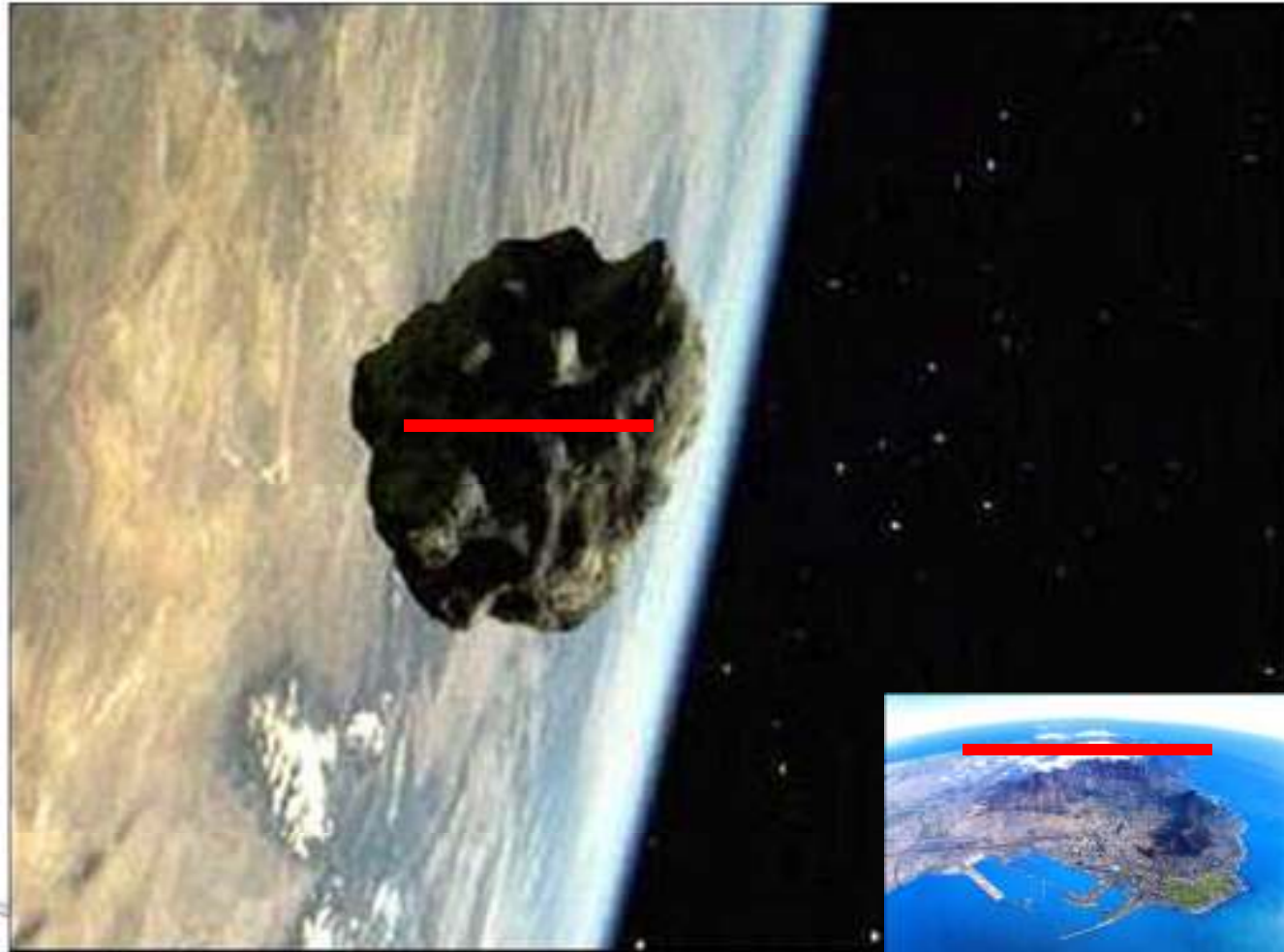
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Head of Research
AORTIC 2013



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Cancer affects us all...

2 Billion years ago



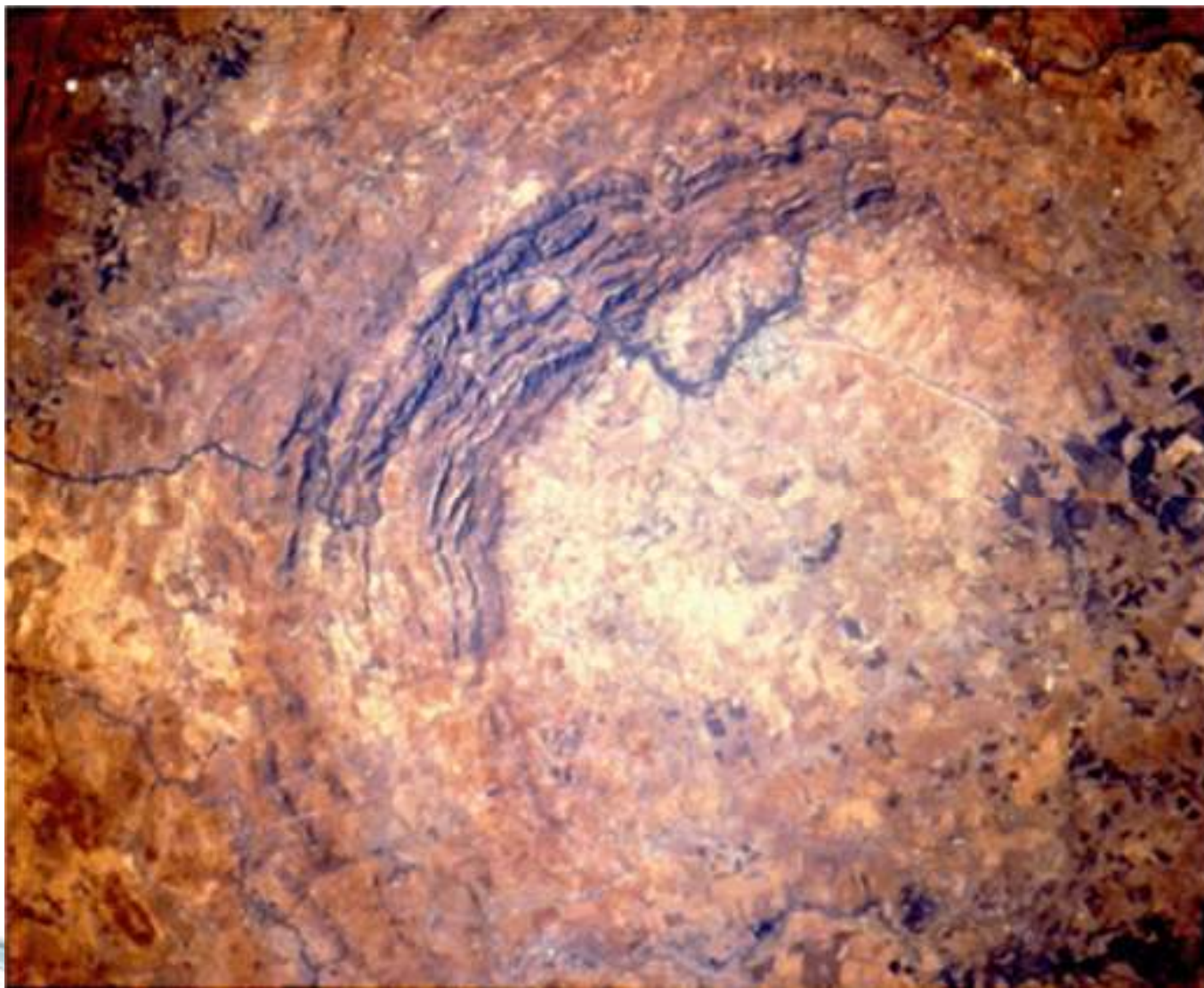
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Impact

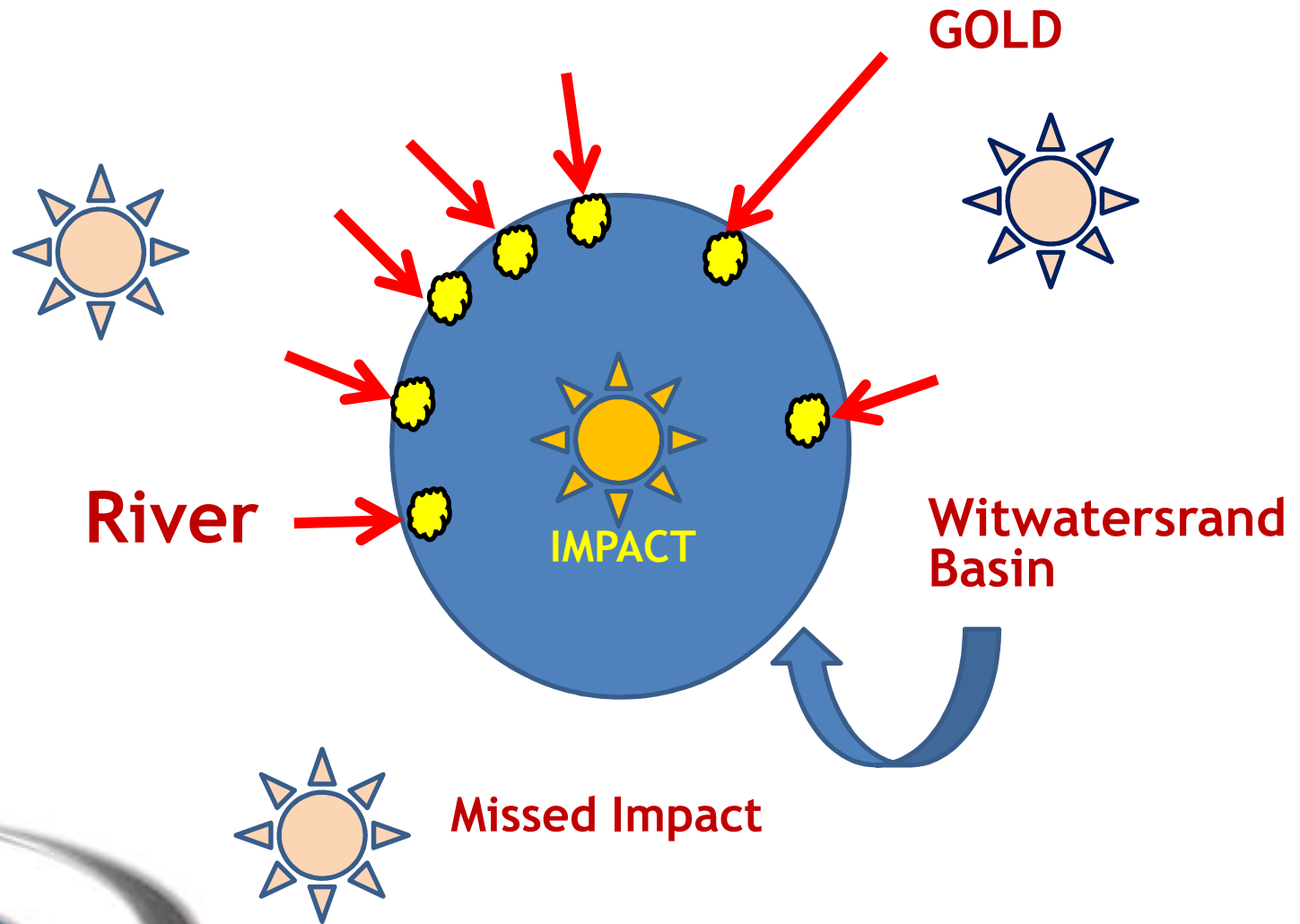


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Vredefort Dome

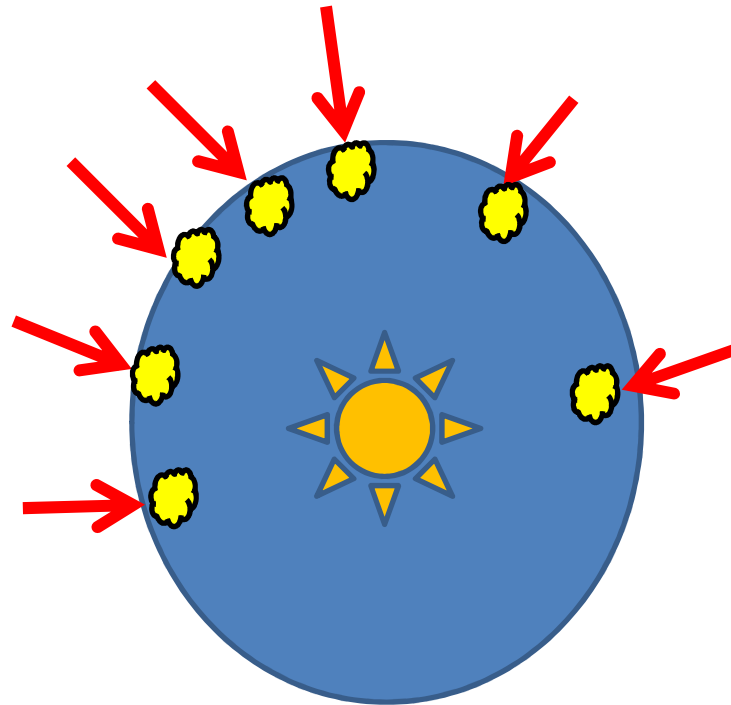


Impact in centre of Witwatersrand Basin.



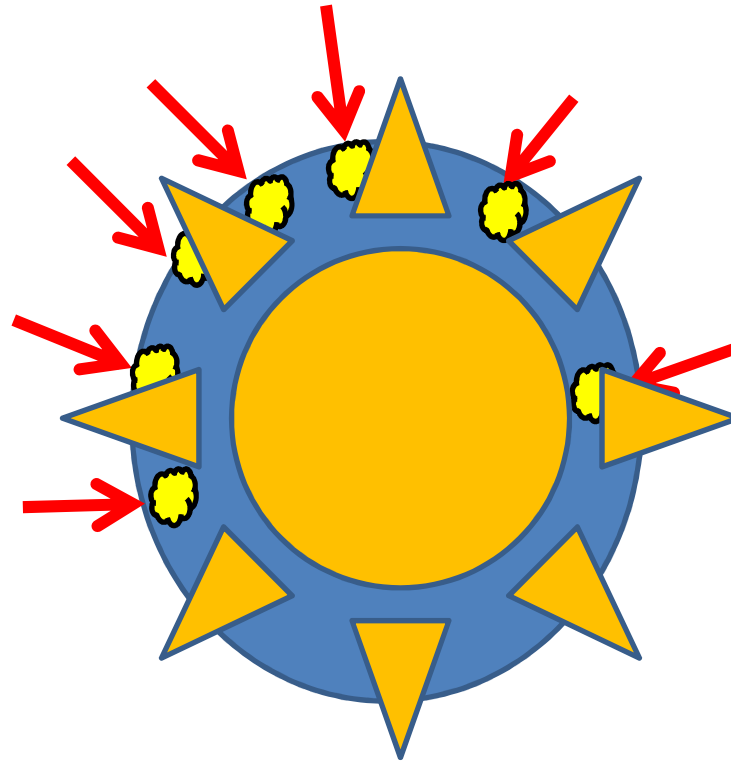
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Bull's eye



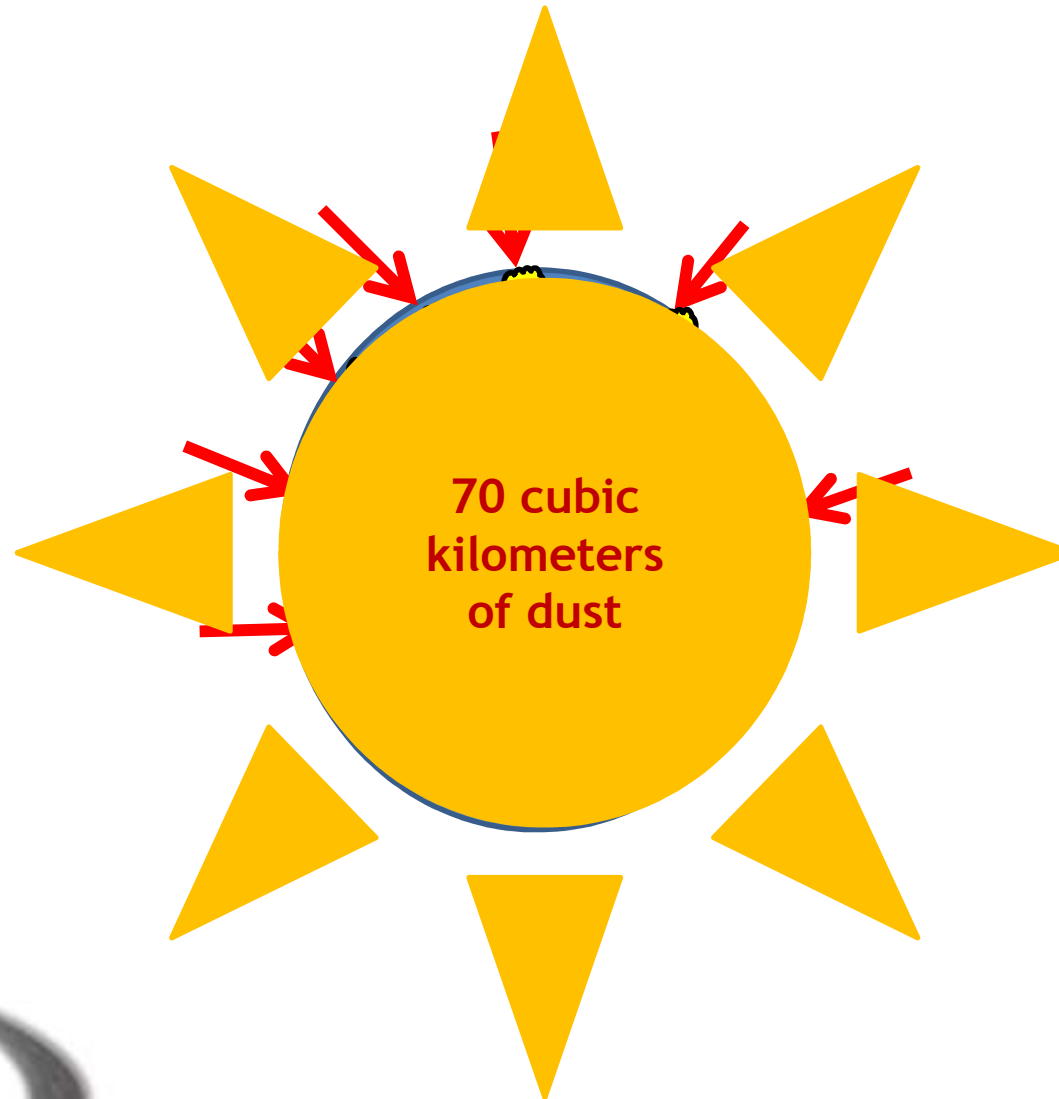
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Forming 70 cubic km dust



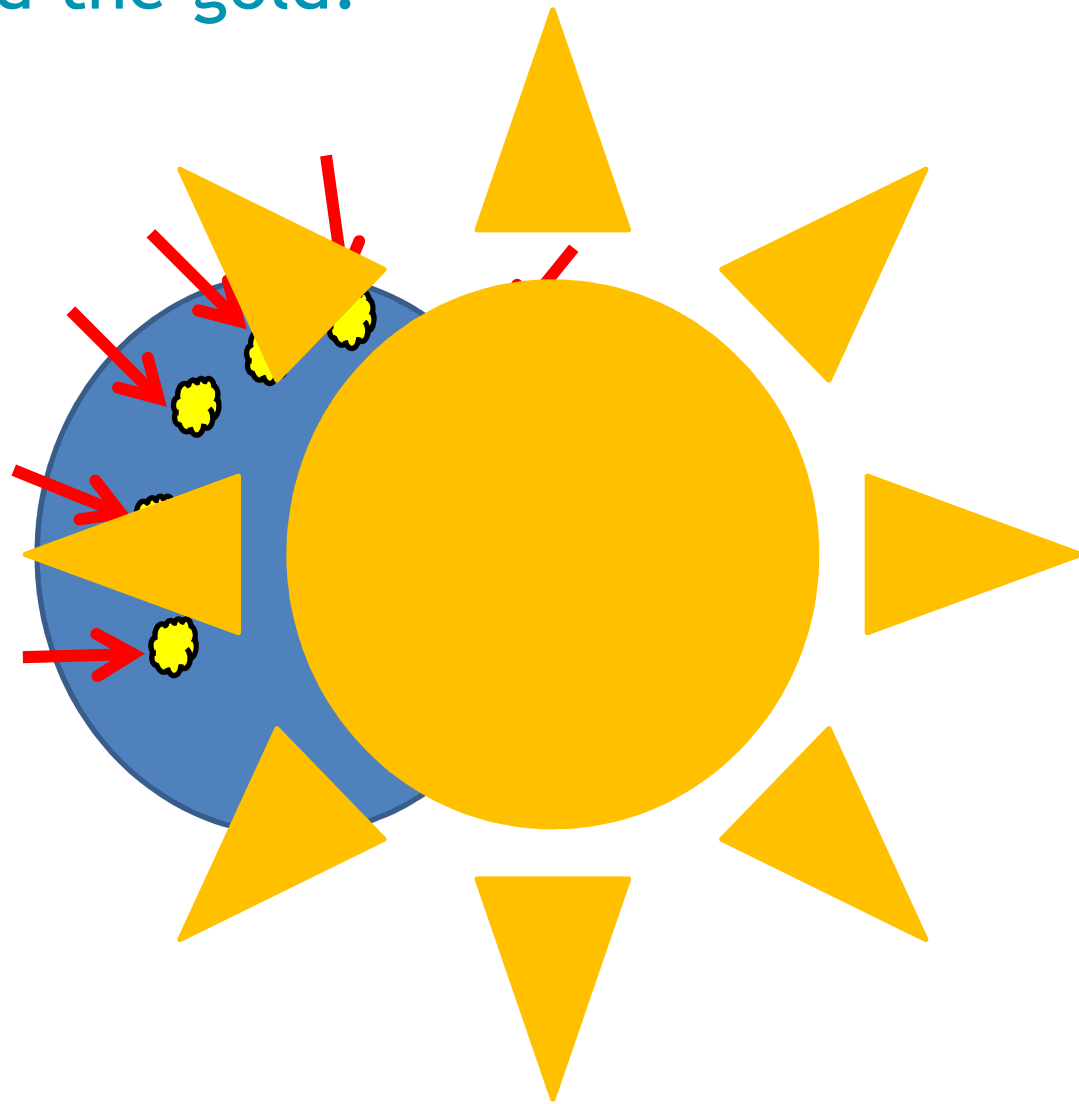
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Asteroid covers and protects
gold for 2 billion years.



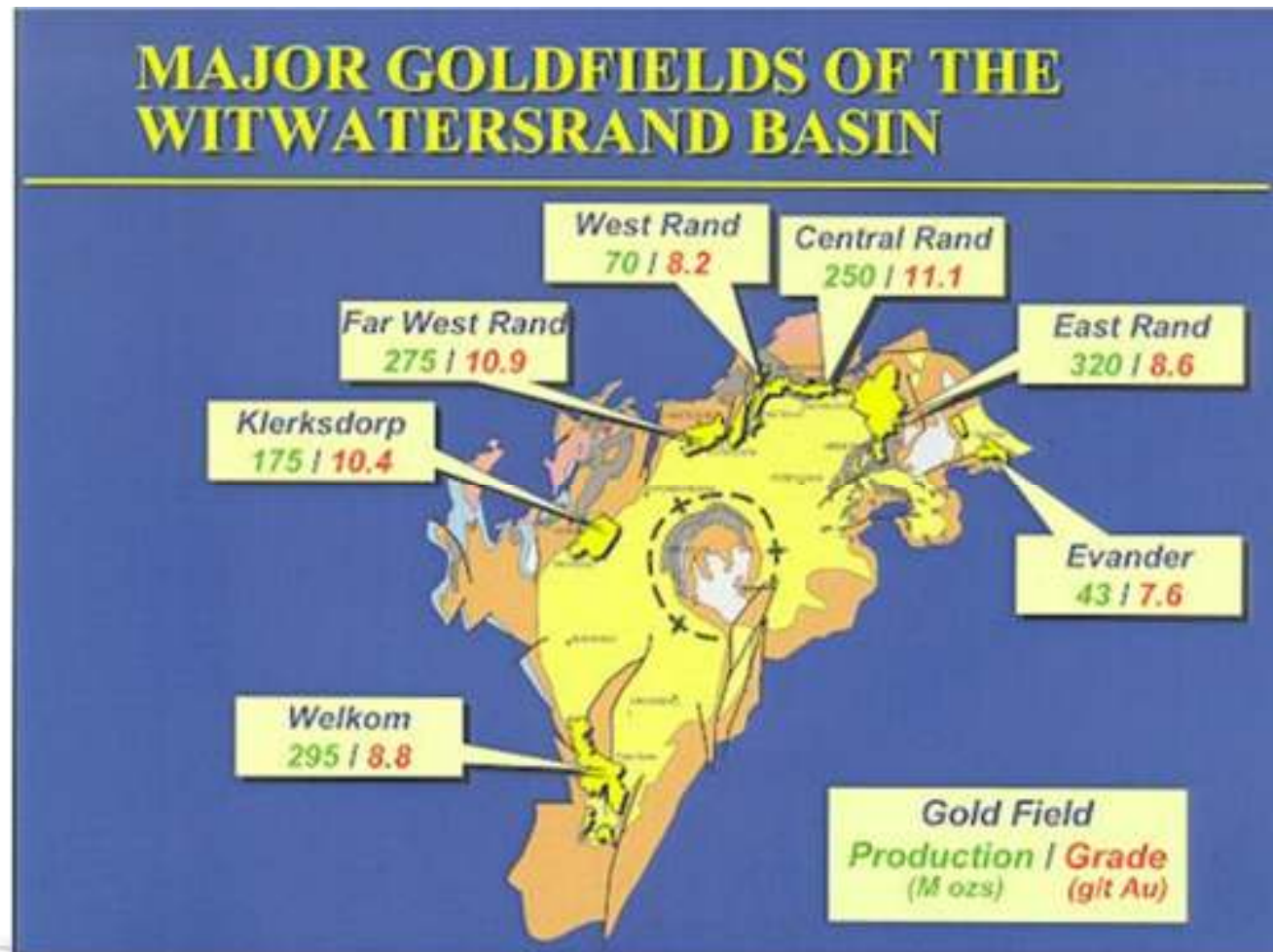
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A near miss would not have protected the gold.



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South Africa wins the Lotto



Cancer affects us all...

One chance in 200 000



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Working Hypothesis

- That uranium in the gold mining environment has become bioavailable
- in humans and poses a potential carcinogenetic threat.



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Materials and methods

- Sand, water, human hair and human teeth were collected from sites situated on the West Rand near Johannesburg, Carletonville, and Potchefstroom.
- Samples were analysed with ICP-MS at WITS Environmental Chemistry Department (Dr Hlanganani Tutu).



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Sample locations

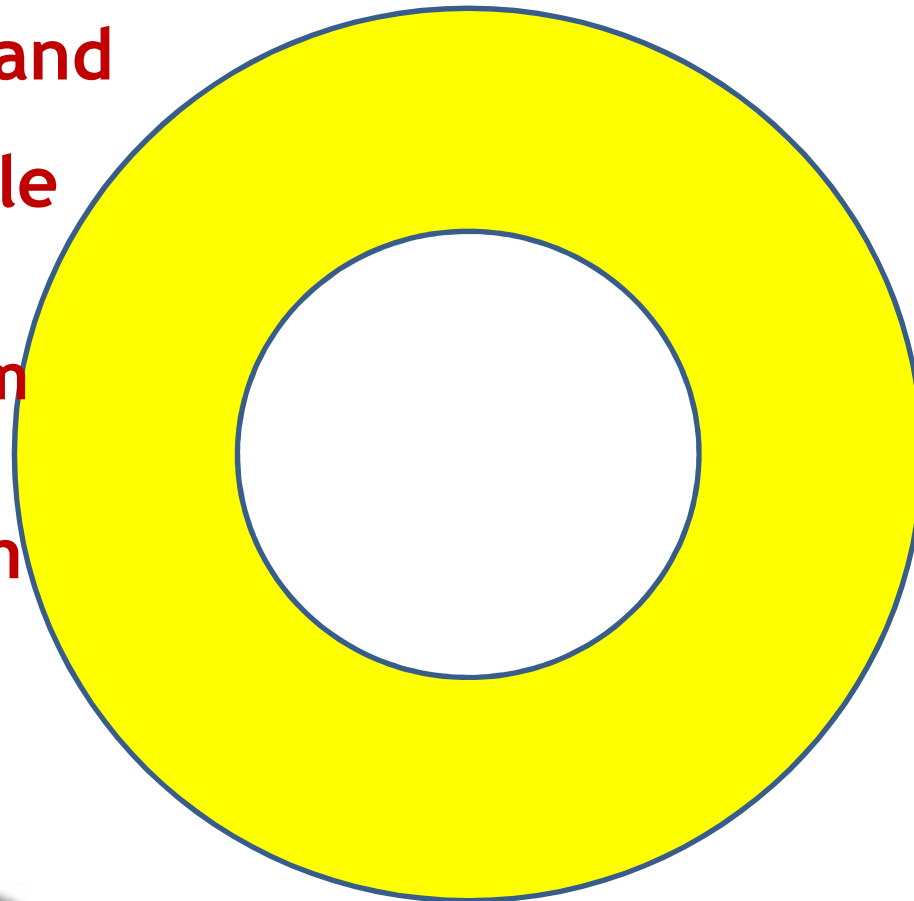
Johannesburg

West Rand

Carletonville

Potgieter's Farm

Potchefstroom



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**Rene Potgieter &
Bonnie**

4th April 2009



Results (mg/kg)

Study	Site	Sample		n	U	Pb	Pb/U
1	C	Tailings	dust	10	14	44	3.1
2	C	Decant	dust	6	44	219	5.0
3	C	House	dust	2	15	118	7.9
4	PF	Hair	Tap	11	0.3	6	20.0
5	PF	Hair	Bore	7	0.4	30	75.0
6	PCS	Teeth	adult	4	0	43	43
7	WR	Mine	dust	41	198	53	0.27

C = Carletonville
PF = Potgieter's farm
PCS= Potchefstroom
WS = West rand

N=Number of samples
U = Uranium
Pb = Lead
Pb/U = Lead/uranium ratio



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Conclusions

- Lead and uranium have been detected in human tissue (hair and teeth) in this area for the first time.
- In 6/7 studies lead dominated uranium in mg/kg
- In all 3 human studies there was 20-times or more lead than uranium in the human tissue.
- West Rand tailings showed much less lead than uranium.
- It appears that the distribution of lead in tailings is heterogeneous with higher concentrations near Carletonville.
- The reason for this is unknown.
- Lead is a carcinogen and can cause aggression. Relevancy to this study is unknown.
- Further data are required to confirm the presence and concentration of lead relative to uranium in house dust and hair samples from different locations in the mining area.





Thank You