



Implats Seismic related Incidents

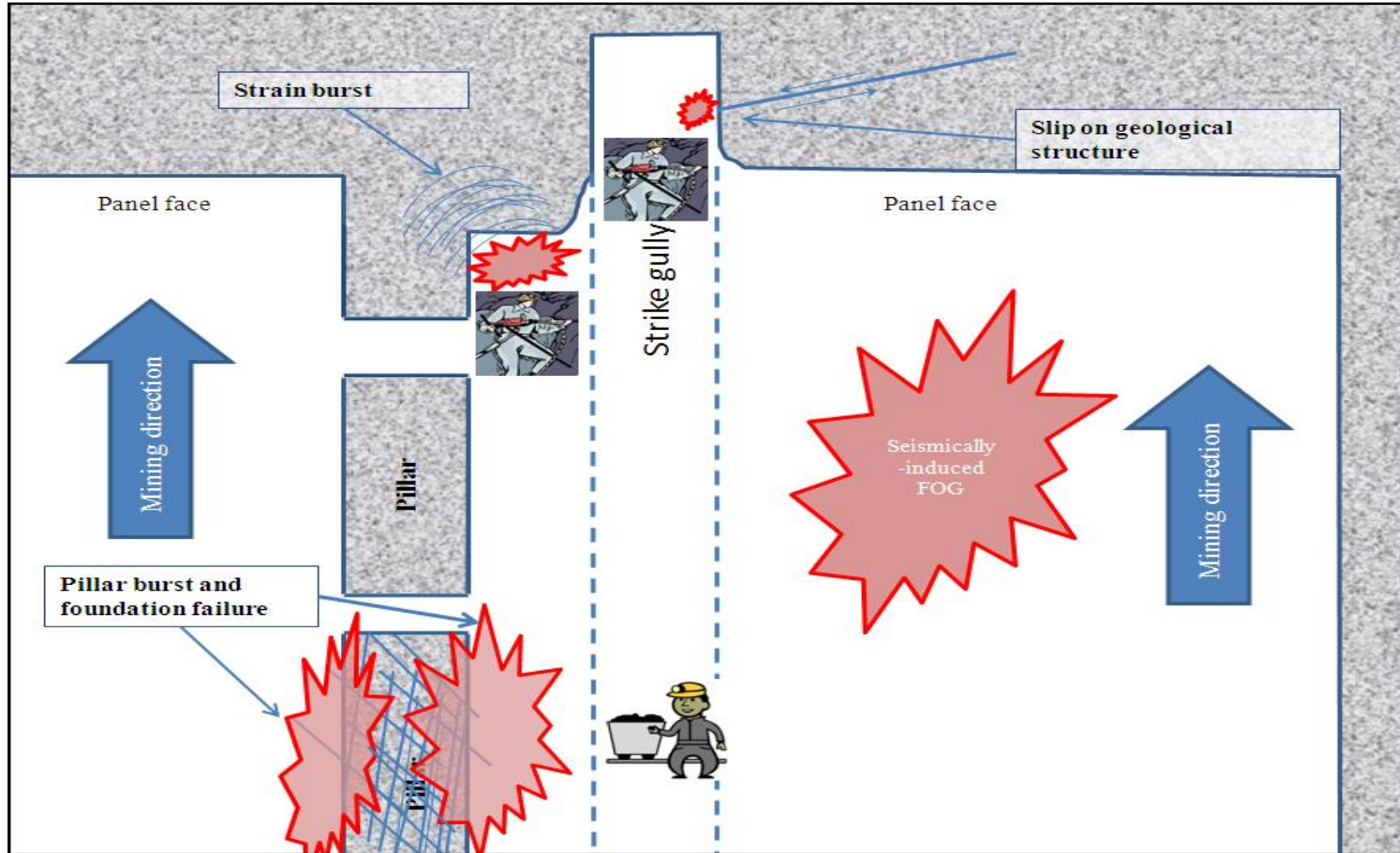
Lesiba Ledwaba _ Mine Seismologist

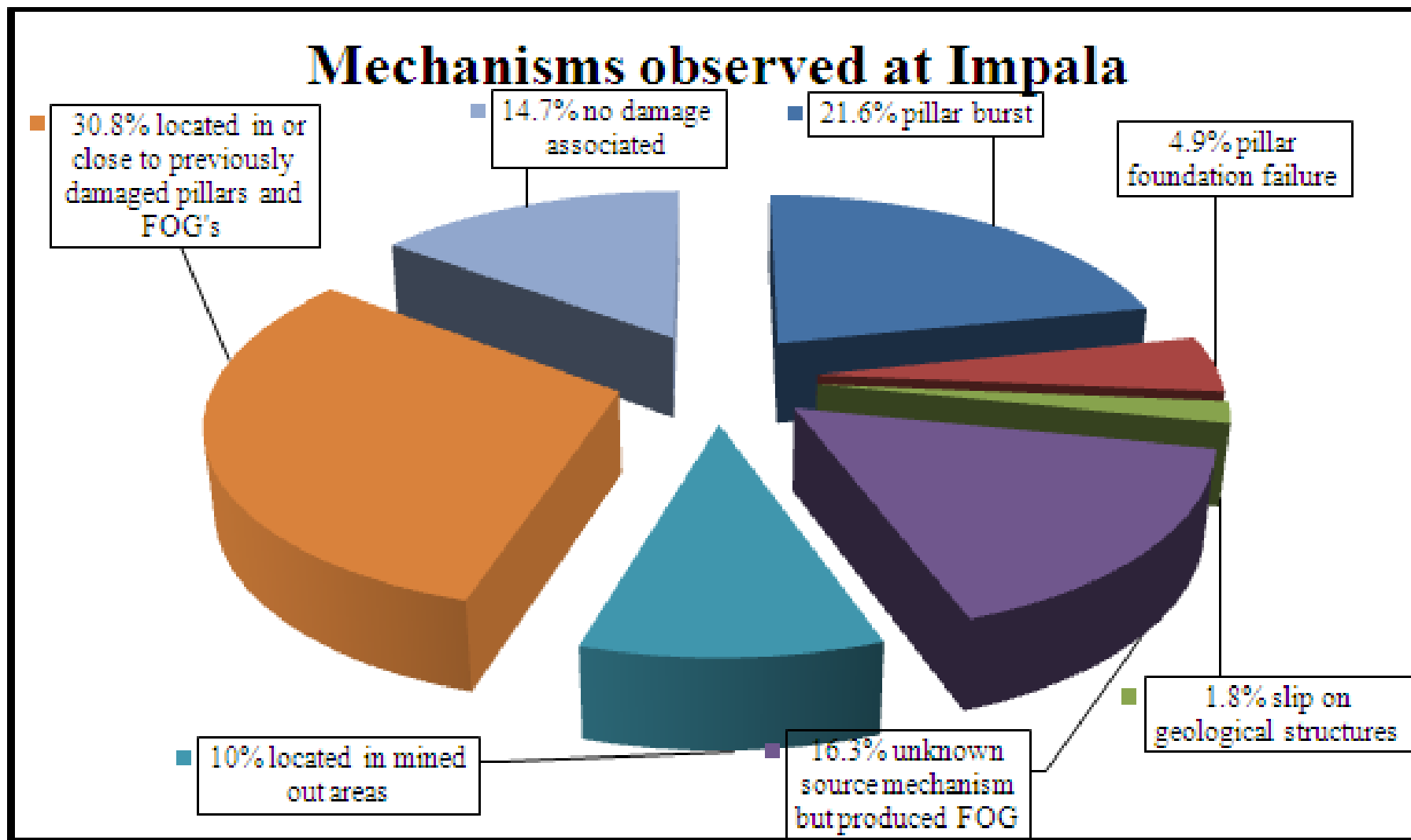


Rockburst Incidents



Source Mechanisms inferred from damage mechanisms







Rockburst Damage

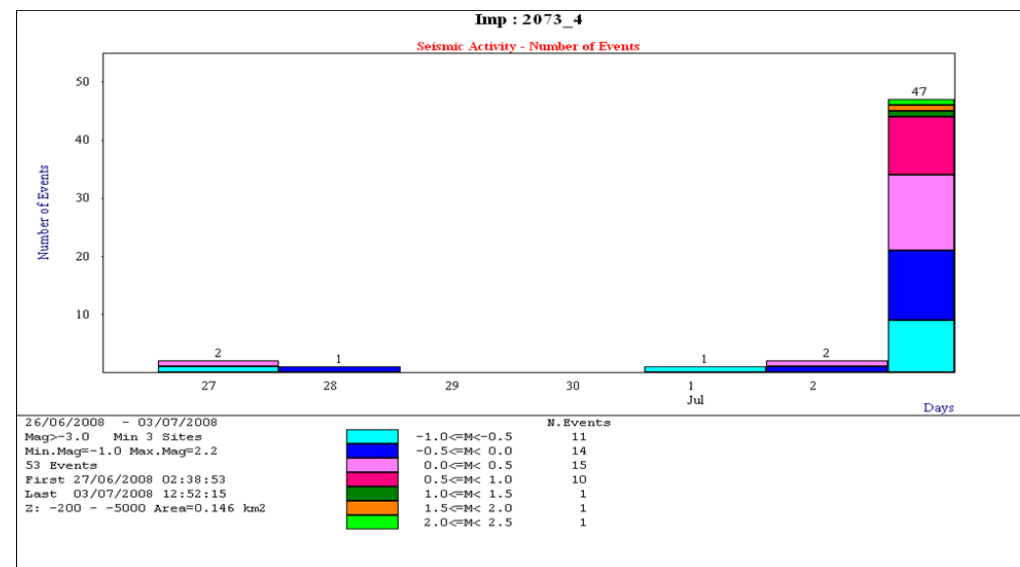


10 Shaft Severe Seismic Activity

Table 1 List of events with $M_L > 0.0$ recorded since within April 2008

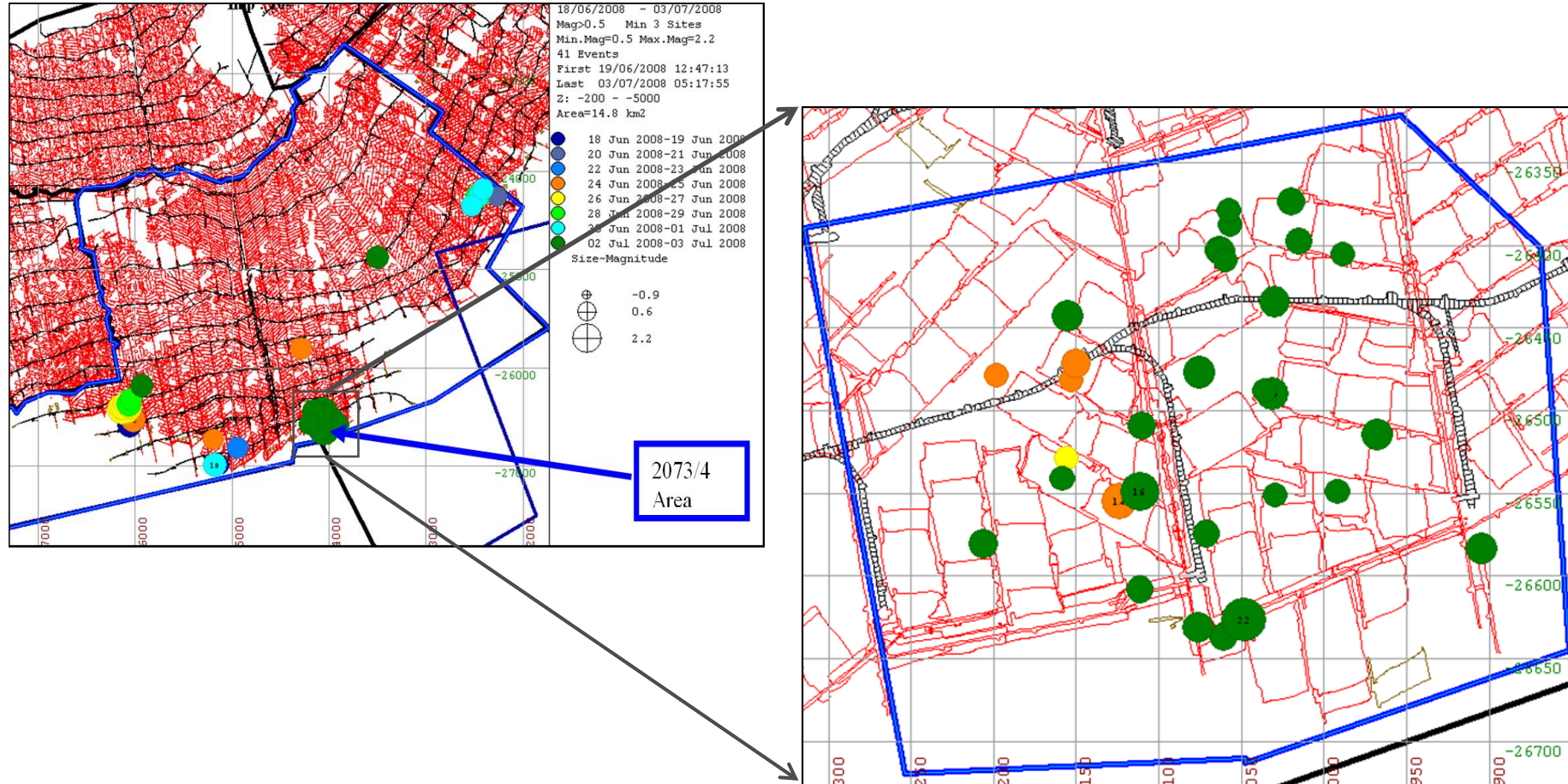
Date	Time	X	Y	Z	Mag
02/07/2008	13:45:44	824061	-26637	-1918	0.4
03/07/2008	02:37:07	824048	-26627	-1910	2.2
03/07/2008	02:37:15	824111	-26609	-1969	0.4
03/07/2008	02:37:38	823968	-26514	-1902	0.8
03/07/2008	02:37:42	824031	-26490	-1993	1.0
03/07/2008	02:37:43	824071	-26575	-1998	0.4
03/07/2008	02:37:47	824030	-26434	-1991	0.7
03/07/2008	02:37:49	823991	-26549	-1982	0.1
03/07/2008	02:38:03	823905	-26584	-1916	0.8
03/07/2008	02:38:32	824063	-26403	-1963	0.5
03/07/2008	02:38:34	824056	-26388	-1955	0.0
03/07/2008	02:38:41	824064	-26403	-1961	0.5
03/07/2008	02:38:42	824062	-26404	-1958	0.5
03/07/2008	02:38:46	824111	-26549	-1974	1.6
03/07/2008	02:39:33	824036	-26488	-1913	0.0
03/07/2008	02:39:42	824059	-26409	-1937	0.0
03/07/2008	02:40:10	824075	-26477	-2016	0.9
03/07/2008	02:40:50	824110	-26509	-2015	0.4
03/07/2008	02:41:58	823989	-26405	-1948	0.0
03/07/2008	02:42:24	824020	-26374	-1988	0.4
03/07/2008	02:42:26	824015	-26398	-1913	0.3
03/07/2008	02:43:18	824076	-26631	-2012	0.8
03/07/2008	02:49:38	824058	-26379	-1954	0.0
03/07/2008	03:00:36	824155	-26443	-1955	0.8
03/07/2008	03:03:45	824158	-26541	-1983	0.0
03/07/2008	04:12:11	824029	-26551	-1958	0.0
03/07/2008	05:17:55	824206	-26581	-1944	0.6

A seismic event with $M_L = 2.2$ and a series of seismic events with magnitudes ranging between 0.0 and 1.6 that occurred on the 03/07/2008 and locates near 1973 crosscut panel in 10 Shaft



47 Events were recorded within 30 minutes
24 of which had $M_L > 0.0$

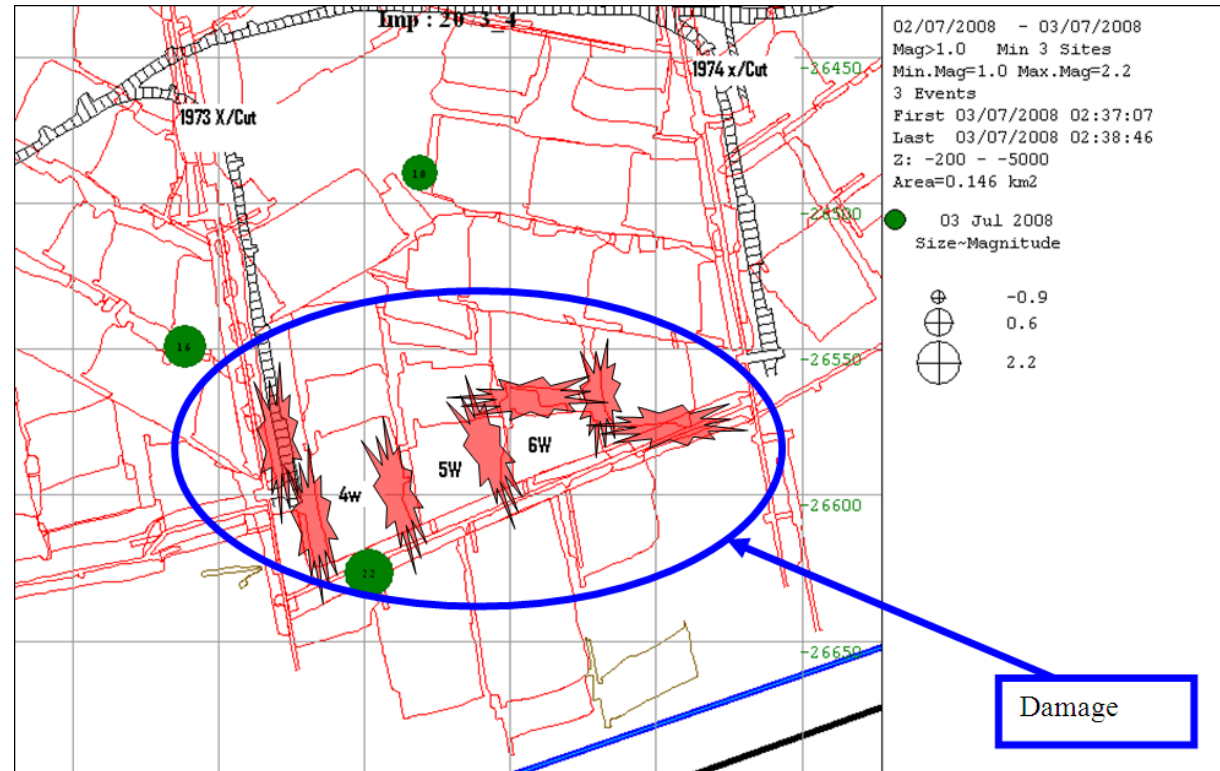
Location of seismic events



Damage observed

A thorough investigation was conducted through 2073 and 2074 panels, whereby:

Pillar burst/foundation failure within panel 6W, 5W and 4W, which led to total collapse of panel 4W and total collapse of 1973 crosscut were observed



Damage within Panels



Crosscut damage

