
 Università di Cagliari
 Dipartimento di Scienze della Terra
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**Natural attenuation of contaminants in mine drainage
 at abandoned mines**

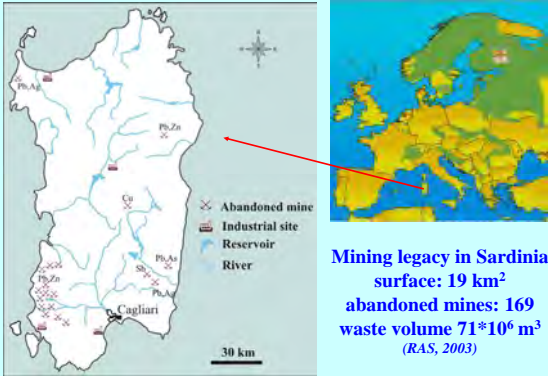
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IMWA 2010, September 2010, Sydney

Scheme of presentation


- ✓ *past mining in Sardinia*
- ✓ *level of contamination*
- ✓ *temporal variations*
- ✓ *attenuation processes*

Past mining in Sardinia: pre-Roman to 1990s



Mining legacy in Sardinia
 surface: 19 km²
 abandoned mines: 169
 waste volume 71[±]10⁶ m³
 (RAS, 2003)

Study area: Pb-Zn ore hosted in silicate-dominated rocks

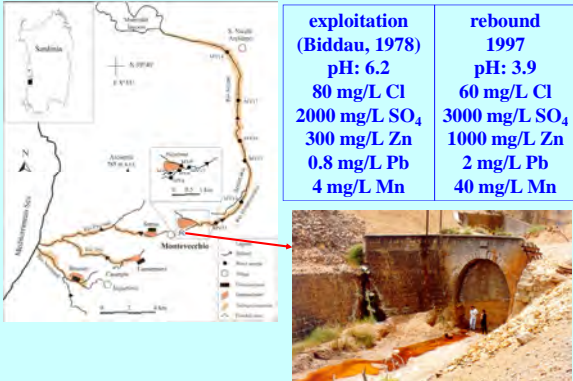


Water analyses

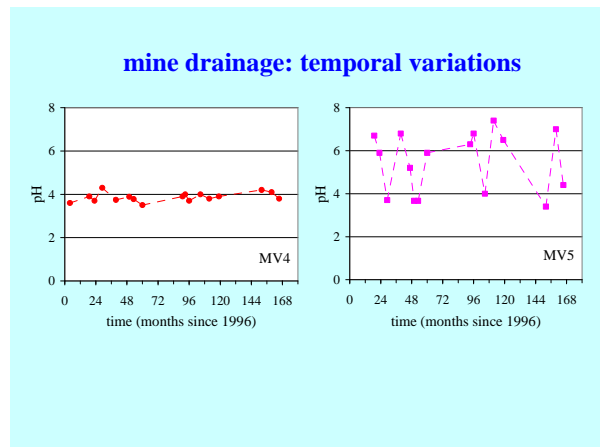
in situ:
 filtration (0.4 μm)
 + 1% HNO₃
 T, pH, Eh, alk.

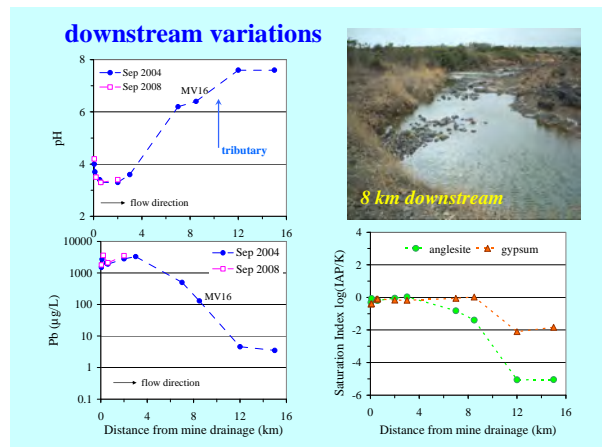
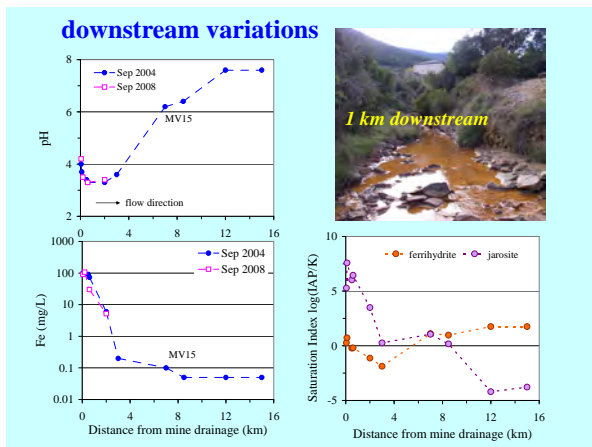
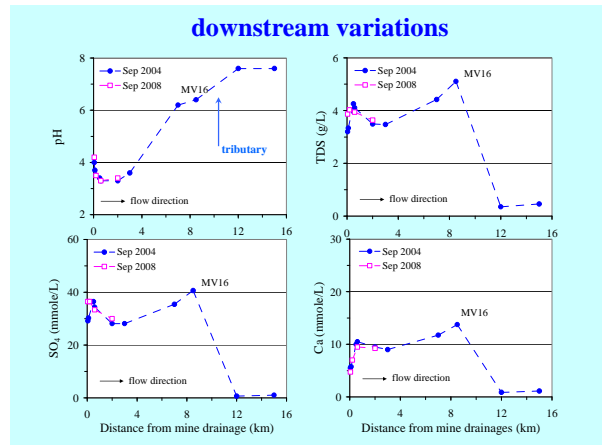
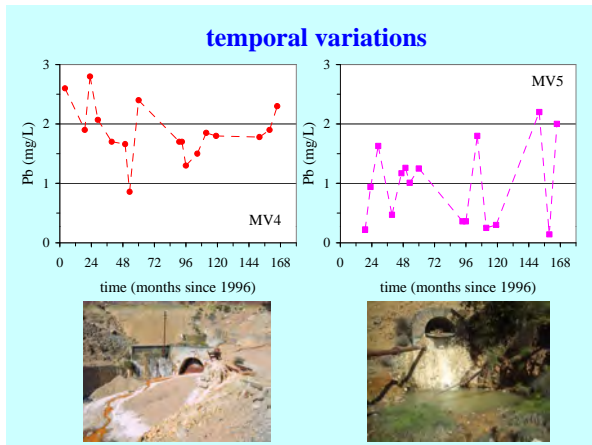
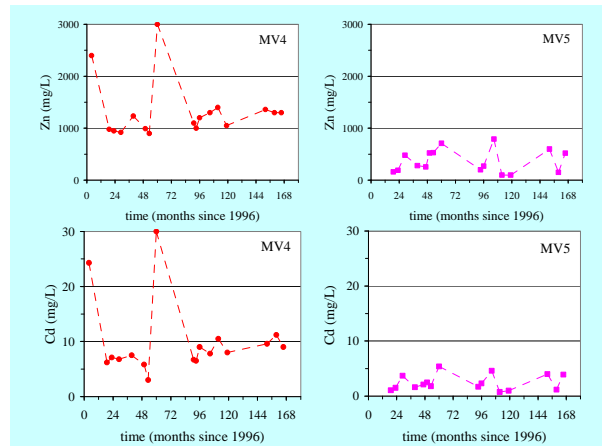
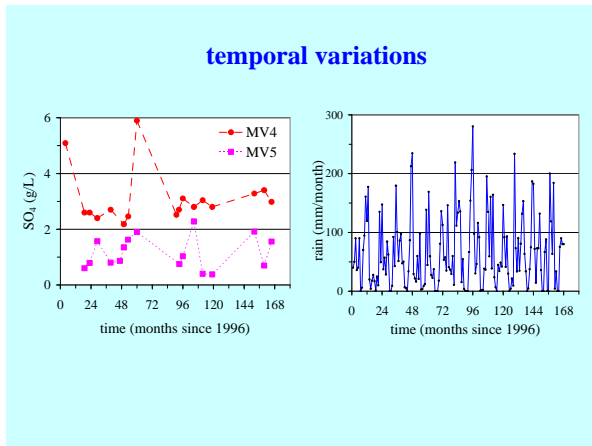
in lab:
 anions by IC
 cations by ICP-OES
 traces by ICP-MS

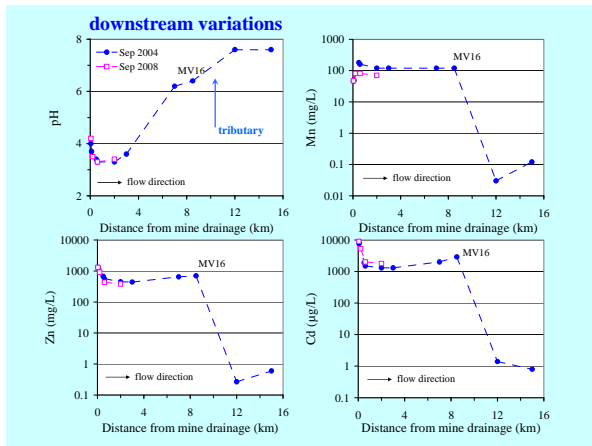
mine closure in 1980s: rebound effects



exploitation (Biddau, 1978)	rebound 1997
pH: 6.2	pH: 3.9
80 mg/L Cl	60 mg/L Cl
2000 mg/L SO ₄	3000 mg/L SO ₄
300 mg/L Zn	1000 mg/L Zn
0.8 mg/L Pb	2 mg/L Pb
4 mg/L Mn	40 mg/L Mn







metals from Montevecchio into the lagoon

Marceddi lagoon

flow L/s	10	70	400
Zn kg/d	0.5	1.8	10
Cd kg/d	0.001	0.01	0.7
Pb kg/d	0.003	0.06	1.7

- suggestions for reducing environmental risks**
- ❖ *stabilization of solid residues*
 - ❖ *runoff diverting*
 - ❖ *treatment of mine drainage*
 - ❖ *wetland / decantation pond*
- correct disposal and management of mining residues should be mandatory at each active mine**

