Power stations as a source of atmospheric particulate matter in southern Poland

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High concentration of atmospheric particulate matter in southern Poland is a problem of great meaning. The improvement of this situation needs the recognition of the source of aerosol particles (natural or anthropogenic; local source or long distance transport). Power stations are considered to be an important source of atmospheric pollution in Poland. Changes in fuel used (coal, coal+biomass, biomass) and in combustion technology caused much bigger variability in the composition and morphology of fly ash particles than it was noted in the past when pulverized coal boilers were mainly used. Interpretation of origin of aerosol particles is also more difficult.

Fly ash from coal fired pulverized bed and fluidized bed boilers is similar in chemical composition but mineral composition differs (less mullite and glass in ash from fluidized bed boiler but more coaly irregular particles) as well as morphology of particles. Fly ash from coal and biomass co-combustion in pulverized bed boiler is rich in SiO_2, Al_2O_3, Fe_2O_3, MgO and CaO. Beside quartz, mullite, glass, Fe oxides, Ca, Ca-Mg or Ca-Mg-Fe oxides are present. Aluminosilicate spheres (<1 μm - 50 μm) are accompanied by numerous, usually porous and less regular spheres Ca or Ca-Mg, Ca-Mg-Fe oxides. Fly-ash from fluidized bed boiler fired with biomass is rich in SiO_2 (content of CaO is low; Al_2O_3 very low). Bigger particles are composed of quartz core with reaction rim or of glass, smaller (<1 mm - 10 mm) are represented by glassy spheres or irregular fragments of glassy particles.

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Delamination of the North China Craton: A widespread phenomenon or a one-off situation?

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The North China Craton is widely recognized as the type-example of delamination of an Archean craton and, although it has been extensively investigated over the past decade, many and diverse reasons have been suggested to explain the phenomenon; but with little consensus reached. Although several surface features and the Mesozoic rock record indicate it was operative in the Cretaceous, outstanding issues include: when did delamination/thinning commence; what were the mechanisms involved; was there a link to marginal orogenic belts; was paleo-Pacific plate subduction a controlling factor; and did global tectonic processes play a role? A review of geological data from the Archean to the present-day indicates a number of unique features in the North China Craton that most likely contributed to its 'decratonization' in the Mesozoic [1]. However, were these sufficient to make it a one-off situation or was this process more widespread in the geological past? This has important implications with respect to the preservation of ancient continental crust and thus for models of continental growth. Tomographic studies indicate that other cratonic areas also have thinned lithosphere, but it is uncertain if this, on its own, will ultimately lead to their destruction. Since the thickness of the lithosphere exherts an important control on the deformation of continental blocks when they get dismembered and re-distributed in supercontinent cycles, it is important to identify features that may have resulted from earlier delamination or thinning. Likewise, the fact that certain areas currently involved in collisional events, such as Tibet and Iran, have thickened lithospheres with seismic properties that resemble cratonic areas [2], indicates that 'cratons' may develop by several different mechanisms, perhaps with diagnostic characteristics. Evidence from the North China Craton will be reviewed with respect to the various models proposed to explain delamination/thinning, with the aim of resolving some of the contentious issues and leading toward a consensus.

[1] Yang *et al*. (2008), *Geology* **36**, 467-470; [2] McKenzie & Priestley (2008), *Lithos* **102**, 1-11.

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