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COMMENT

Response to the comment on 'Eden model on the Manhattan lattice'

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Abstract. We respond to the numerical simulation result, obtained by Botet, which implies that the Eden aggregates should be compact objects and comment on the validity of the renormalisation group approach to the same problem.

In view of the recognised methodological difficulties encountered in applying the position space renormalisation group method to the geometric models and, in particular, to the models of random aggregates, we challenged (Chernoutsan and Milošević 1985) a computer simulation to check results we obtained for the Eden aggregates on the square Manhattan lattice (SML). We emphasised that a good convergence of our numerical findings could not be expected, and that the proper challenging question bears upon the universality classes of the Eden model on SML and on the ordinary square lattice. Botet (1986) accepted the challenge and demonstrated numerically that the two models should be, as far as the fractal dimensions are concerned, in the same universality class. However, there are two points that deserve to be appended.

The first point is related to the credibility of the method (Gould *et al* 1983) we used to construct the renormalisation group transformation for the fugacity parameter K. We remarked (Chernoutsan and Milošević 1985), and Botet (1986) elaborated, that this method may asymptotically lead to the zero critical fugacity, because of the over-importance attached to the history of growth of *compact cells*. Although alternative renormalisation procedures have been introduced (see, for example, Nakanishi and Family 1984), the method of Gould *et al* (1983) should not be disregarded. Indeed, aside from the fact that this method elicited credible results in the case of the other aggregation models (Gould *et al* 1983), it rightly detected (Chernoutsan and Milošević 1985) different short range effects (different degrees of the surface roughness) in the case of the Eden aggregates grown on SML and on an ordinary square lattice.

Our second point concerns the comment (Botet 1986) which stated that Meakin (1983) quashed results of Sawada *et al* (1982). As a matter of fact, Meakin (1983) stated that, on the grounds of his numerical simulations, he *expects* that, when the number of aggregated particles tends to infinity, the fractal dimension D of the Sawada model aggregates becomes equal to the space dimension d, *whereas* Sawada *et al* (1985) declared that, according to their measurements, the fractal dimension does not approach

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d even if the volume (of an aggregate) is infinite. Furthermore, we compared (Chernoutsan and Milošević 1985) the Eden aggregates (on SML) and those of Sawada *et al* (1982) as seen on a finite range of length scales, and for the latter Meakin (1983) admitted that they may be described to a *very good approximation* by a non-trivial fractal dimension.

In short, we acknowledge the demonstration (Botet 1985), achieved by numerical simulations, that the Eden aggregates on SML and on the ordinary square lattice are probably in the same universality class. However, if one adopts the statement (Meakin 1983) that by the numerical simulations alone it is not possible to determine exact fractal dimensions, then a proof, in the style of Richardson (1973), that $D_{EM} = 2$, where D_{EM} is the fractal dimension of the Eden aggregates on SML, would be most welcome.

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