**Appendix A: sequential simulation under a moving neighborhood approximation**

This appendix aims at showing that, except when using cokriging in a unique neighborhood, the sequential algorithm is likely not to reproduce the correlation coefficients between the simulated random fields. For simplicity, consider the non-conditional simulation of a vector random field with two components **Y** = (*Y*1,*Y*2) over domain D = {**x**1,…, **x***n*}. Further assume that the first component *Y*1 has already been simulated using a moving neighborhood approximation. In such a situation, as shown by Emery and Peláez (2011), the spatial correlation structure of the simulated field (denoted by ) is different from the correlation structure of the target random field, i.e., for a pair {**x***i*,**x***j*} of locations one usually has:

. (A1)

Consider now the simulation of the second component *Y*2 at a given location **x***k*. The simulated value is (Eq. 2):

, (A2)

with  the cokriging prediction of *Y*2(**x***k*), where A is a subset of {1,…, *n*}

 the standard deviation of the associated cokriging error

**U** an independent standard Gaussian random variable.

The covariance between the simulated random fields at location **x***k* is therefore:

 (A3)

For  to be equal to *C*12(**0**), the following conditions need to be fulfilled:

(1) *k* ∈ A

(2) .

In such a case, the identity  stems from the simple cokriging equations. Condition (1) holds as soon as the cokriging neighborhood contains the collocated information, but condition (2) is generally not true (Eq. A1), unless a unique neighborhood cokriging is used to simulate *Y*1. Similarly, both conditions need to be fulfilled for the variance of *Y*2(**x***k*) to be equal to *C*22(**0**). Accordingly, when using cokriging in a moving neighborhood to run sequential simulation, the correlation coefficients between the simulated random fields may not be reproduced. A general expression of the spatial correlation structure of these fields can be found in Emery and Peláez (2011).