

## **DEPENDENCE OF NUMERICAL SMEARING AND RAY EFFECT IN DISCRETE-ORDINATES METHOD**

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### **ABSTRACT**

Solutions of the integro-differential equation of radiation transfer via numerical methods were well known to suffer from two distinct shortcomings: (1) numerical smearing error due to spatial domain discretization, and (2) ray effect error due to angular discretization. In this study, it is shown that both error types exhibit dependence on both spatial and angular discretization. Proportionality expressions for various orders of numerical smearing errors are derived, and ray effect is categorized into local and propagation errors. Using the DOM, it is found that refinement of spatial grid can reduce both error types without a necessary change in direction number, while increase in direction number mandates a necessary increase in spatial refinement to minimize error sources.