

Stereotactic radiosurgery (SRS) has become an important clinical tool for treatment of small lesions in brain, including benign conditions, malignant tumors and localized metastatic foci. Radiation dosimetry plays a vital role in the outcome analysis, unfortunately dosimetry of small fields used in SRS is difficult due to the large active volumes of detectors compared to the smallest SRS fields. This is compounded with loss of lateral electron-equilibrium. SRS dosimetry has been attempted with limited success with small volume ion chambers, diode, diamond, TLD and films. The cone factor (CF) for a specific cone C at depth d is defined as: $CF = D(C,d)/D(C_{ref},d)$, where C_{ref} is the reference cone. Using the BEAM/EGS4 Monte Carlo (MC) code, photon spectra in air and in water, depth doses and lateral dose profiles were calculated for several cones (0.5-5 cm diameter fields at isocenter). Results indicate that the MC calculations provide slightly higher CF compared to the measurements based on the ratio of detector response. When the lateral resolution of the detectors are taken into account the results agree within a few percent for most fields and detectors. Based on calculated spectra the validity of the assumption that measured dose ratios are equal to measured detector readings was verified. Detailed analysis and spectral distributions are presented for various cone sizes.