Low energy radioactivity BG model in Super-Kamiokande detector from SK-IV data

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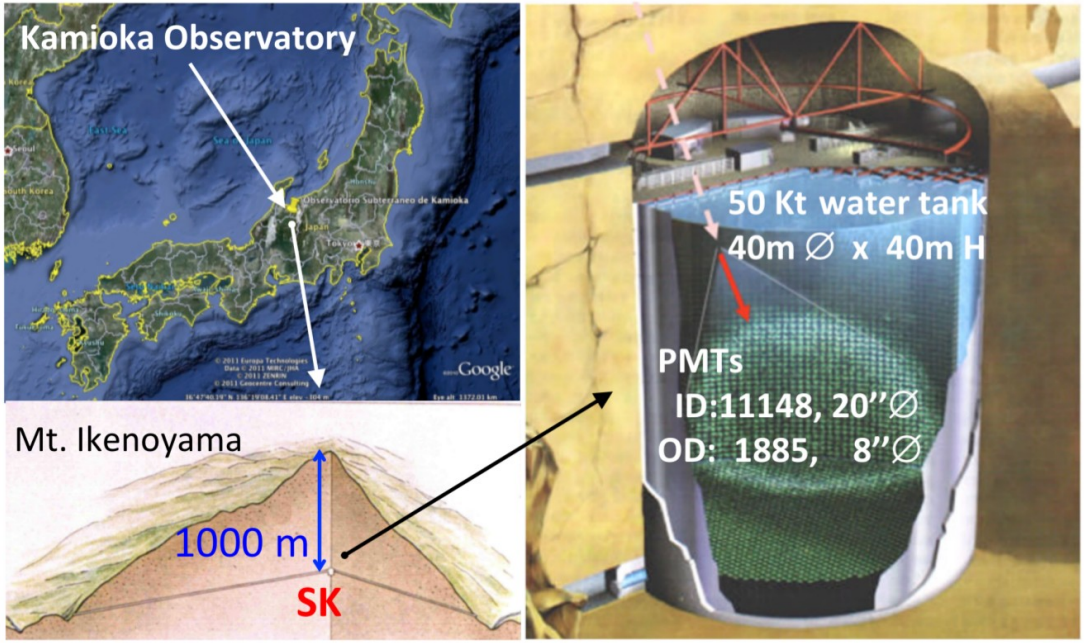
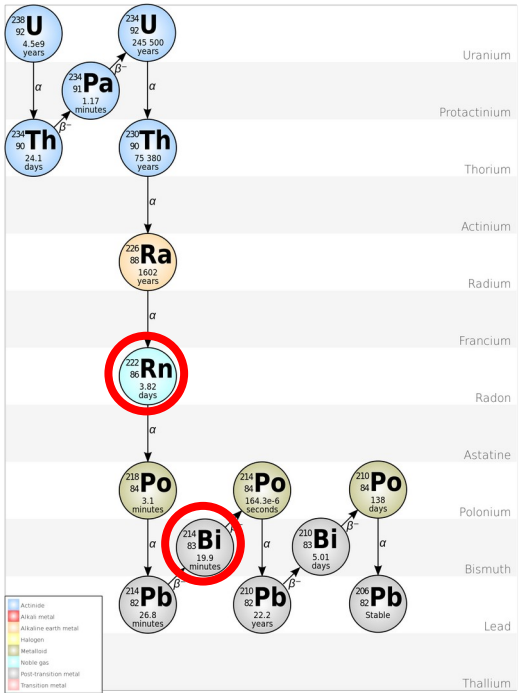
Super-Kamiokande and the Radon BG

- Super-Kamiokande:
  - Succesful neutrino experiment located in Kamioka-cho (Japan) under Ikenoyama.
  - 50 ktons water Cerenkov detector
  - Neutrino analysis from the MeV scale (solar neutrino, supernova relic neutrinos, etc.) to TeV (atmospheric neutrinos).

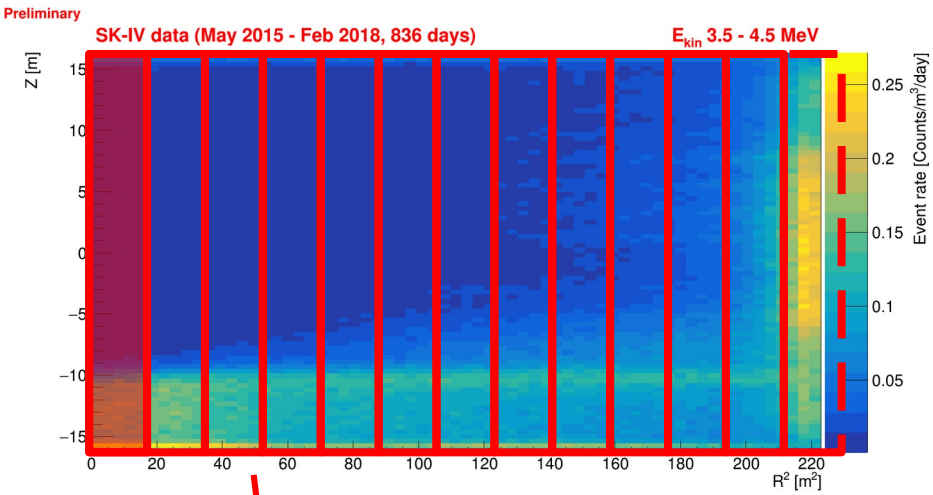


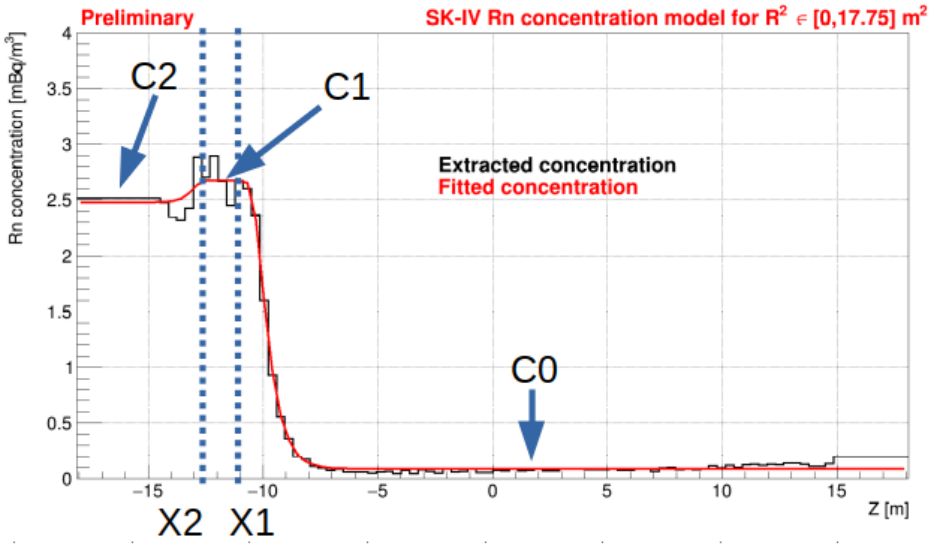
- Radon: radioactive gas dissolved in water
  - Dominant BG for E<5 MeV due to ^{214}Bi decays (Q-value 3.27 MeV)
  - In SK: Rn concentration is monitored at fixed positions. Rn injection were performed to determine the Rn impact on data.
  - The exact distribution of Rn in the detector is not well known → Need a Rn model

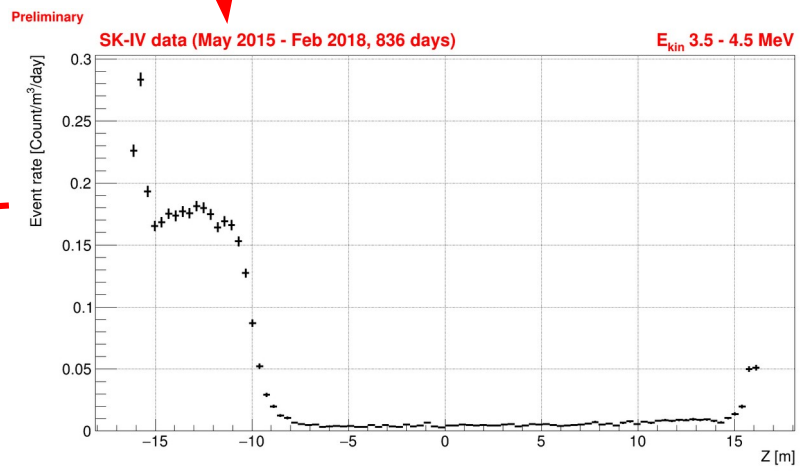


Construction of a Radon model

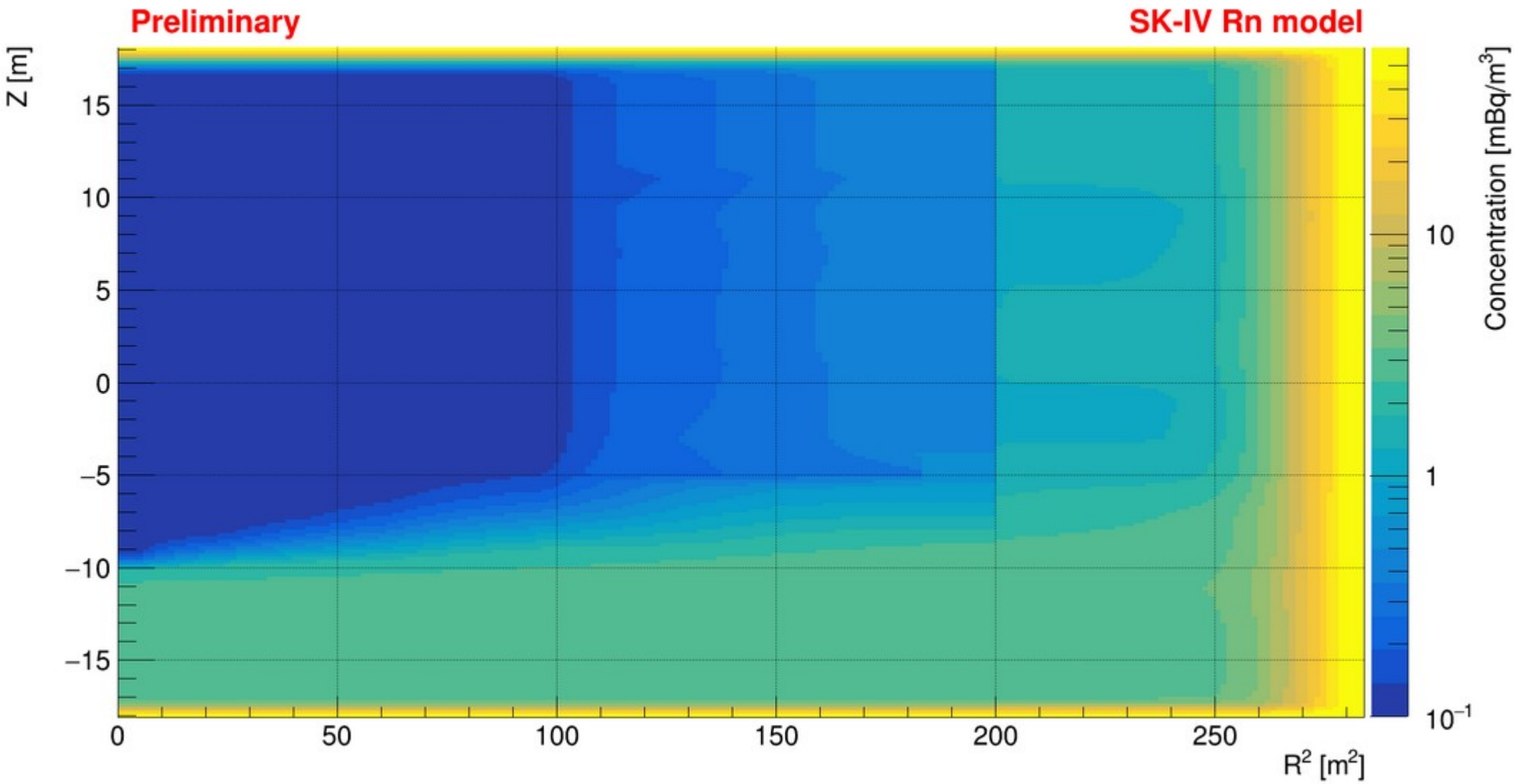
- In order to construct a model of the Rn concentration, we used SK-IV solar data and MC simulation of the ^{214}Bi decays:
  - We extract and model the Rn concentration as 1D distribution in multiple layers of the detector
  - The final model is then build by interpolating each 1D distribution







Rn model



- If you are interested to learn more, come to see the poster!