The present understanding of global impurity migration in tokamaks is largely based on observations from experiments using tracers injected into the torus and marker tiles or probes exposed to the plasma [1]. When extrapolating these results to next-step devices, it is noticeable that the magnetic field in, e.g., ITER includes substantially more non-axisymmetric components than in the current experimental devices. In ITER, the magnetic field is expected to include contributions from the toroidal field ripple and resonant magnetic perturbations (RMPs) together with local perturbations that make it largely non-axisymmetric. As experiments on current devices have mostly featured only ripple, the potential influence of non-axisymmetric features of the magnetic field on impurity migration has not been extensively studied. Moreover, most of the modelling of scrape-off layer plasmas is based on an axisymmetric magnetic field and, thus, the understanding of non-axisymmetric effects remains rather limited. In this contribution, the 3D orbit-following code ASCOT is used to study the influence of a non-axisymmetric magnetic field on $^{13}$C transport and deposition in a global $^{13}$CH$_4$ injection experiment carried out on ASDEX Upgrade (AUG) in 2011 [1]. Using a $^{13}$C$^+$ birth distribution resulting from methane dissociation modelled with the ERO code, the global transport of the carbon ions is simulated until their deposition. For simulation of the background plasma, the SOLPS code package is used. According to simulations with only ripple included, ripple induces periodicity into the deposition pattern that can change local deposition by up to 70% compared to an axisymmetric simulation. This 16-fold periodicity corresponds to the number of toroidal field coils in AUG. However, protruding wall structures such as limiters obstruct the formation of the pattern at the outer wall. The experimental scenario is then simulated assuming that the in-vessel coils creating RMPs would be activated. It is observed that this creates local modifications of the deposition pattern near the coils at the top and bottom parts of the outer wall. In the presence of RMPs, the deposition becomes more localized with the effect being dependent of the coil configuration.

The results indicate that neither ripple nor RMPs substantially affect the $^{13}$C deposition pattern on a global scale. Nevertheless, on a local scale it is evident that, according to these predictions, the influence of the non-axisymmetric features is significant.