POVZETEK

V okviru dela na CRP smo se lotili izdelave ocene ogroženosti zaradi delovanja drobirskih tokov v Sloveniji in sicer podrobne ocene za 4 hudourniške vršaje v dolini Save Dolinke (Trebiža, Suhelj, Presušnik, Koroška Bela) ter ocene izpostavljenosti nastanku drobirskega toka za celotno območje Slovenije s podrobnejšim prikazom po občinah. Najprej je podan splošni opis nastanka in dinamike drobirskih tokov. Sledi podroben pregled različnih metod za ocenjevanje magnitude drobirskih tokov kot zelo pomembnega elementa izdelovanja ocen ogroženosti. Nadalje so prikazani izračuni magnitud drobirskih tokov za izbrana hudourniška območja v dolini Save Dolinke s pomočjo hidrološkega modeliranja in z uporabo izbranih metod za oceno magnitud. Izbrane vršaje smo podrobno preučili tako, da smo na njih izvedli do 5 m globoke raziskovalne izkope materiala, ki smo ga litološko in sedimentološko opredelili in s pomočjo analiz starosti materiala opravili interpretacijo dogajanja na vršajih v preteklosti. Dodatno smo opravili terenske oglede zaledja vseh vršajev in pripravili njihov litološki opis z opredelitvijo mest možnega nastanka drobirskih tokov v teh območjih. Kot posebno nevaren se je izkazal vršaj Koroške Bele, kjer je nujno ukrepanje na lokalni ravni. Nato sledi opis geotehničnih raziskav odvzetega materiala iz raziskovalnih izkopov na vršajih z namenom ocenjevanja transportnih lastnosti teh materialov kot osnove za določanje ocene nevarnosti nastanka drobirskih tokov in njihovo podrobno modeliranje. Gibanje drobirskih tokov na 4 vršajih smo opravili z 2D matematičnim modeliranjem ob upoštevanju rezultatov analize magnitud in rezultatov podrobne senzitivnostne analize geometrijskih in reoloških modelov vršajev. Končno je podan model napovedi ogroženosti Slovenije z drobirskimi tokovi s podrobnim opisom vključenih dejavnikov in prikazom izbora najprimernejšega modela glede na znane primere drobirskih tokov v Sloveniji. S tem modelom je bila nato pripravljena karta izpostavljenosti pojavljanju drobirskih tokov v Sloveniji v merilu 1:250.000 in podrobni pregled po občinah. V sklepnem poglavju so nakazane možnosti za nadaljnje delo.

SUMMARY

In the framework of the TRP we undertook the preparation of a debris-flow risk assessment in Slovenia, namely a detailed assessment for 4 torrential fans in the Sava Dolinka valley (Trebiža, Suhelj, Presušnik, Koroška Bela) and an assessment of exposure to debris-flow formation for the whole area of Slovenia with a detailed review for municipalities. Firstly, a general description of origin and dynamics of debris flows is given. It follows a detailed review of different methods for assessment of debris-flow magnitudes as a very important element of preparing risk assessment. Furthermore, results of computed debris-flow magnitudes in selected torrential watersheds in the Sava Dolinka valley are shown that were computed using hydrologic modelling and selected methods for assessing magnitudes. We investigated the selected fans in such a detailed way that we dug on them up to 5 m deep research trenches, in which we determined deposits lithologically and sedimentologically and on the basis of sediment age datation we made an interpretation of past events on the fans. Additionally, we made field inspections of the hinterland of all fans and prepared their lithological description with the determination of possible debris-flow origins in these areas. As an especially hazardous proved to be the Koroška Bela fan, where measures should be taken at the local level. It follows a description of geotechnical investigations of sampled material from research trenches on fans with the aim at assessing transport properties of these materials as a basis for determination of debris-flow hazard assessment and their detailed modelling. The debris-flow motion on 4 fans was modelled by using 2-D mathematical modelling and taking into account the results of the debris-flow magnitude analysis and the results of a detailed sensitivity analysis of geometrical and rheological models of fans. Lastly, a debris-flow risk assessment model for Slovenia is presented with a detailed description of incorporated parameters and a presentation of the most appropriate model with regard to know case studies of debris flows in Slovenia. Using this model, a debris-flow susceptibility map of Slovenia in the scale 1:250,000 and a detailed review for municipalities were prepared. In the final chapter, possible future work is shown.