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Characterisation of recently retrieved aerial photographs of Ethiopia (1935-1941) and their fusion with current remotely sensed imagery for retrospective geomorphological analysis

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8281 assemblages of aerial photographs (APs) acquired by the 7a Sezione Topografica during the Italian occupation of Ethiopia (1935-1941) have recently been discovered, scanned and organised. The oldest APs of the country that are known so far were taken in the period 1958-1964. The APs of the 1930s were analysed for their technical characteristics, scale, flight lines, coverage, use in topographic mapping, and potential future uses. The APs over Ethiopia in 1935-1941 are presented as assemblages on approx. 50 cm x 20 cm cardboard tiles, each holding a label, one nadir-pointing photograph flanked by two low-oblique photographs and one high-oblique photograph. The four APs were exposed simultaneously and were taken across the flight line; the high-oblique photograph is presented alternatively at left and at right; there is approx. 60% overlap between subsequent sets of APs. One of Santoni's glass plate multi-cameras was used, with focal length of 178 mm, flight height at 4000-4500 m a.s.l., which results in an approximate scale of 1:11 500 for the central photograph and 1:16 000 to 1:18 000 for the low-oblique APs. The surveyors oriented themselves with maps of Ethiopia at 1:400 000 scale, compiled in 1934. The flights present a dense AP coverage of Northern Ethiopia, where they were acquired in the context of upcoming battles with the Ethiopian army. Several flights preceded the later advance of the Italian army southwards towards the capital Addis Ababa. Further flights took place in central Ethiopia for civilian purposes. As of 1936, the APs were used to prepare highly detailed topographic maps at 1:100 000 scale. These APs (1935-1941) together with APs of 1958-1964, 1994 and recent high-resolution satellite imagery are currently being used in spatially explicit change studies of land cover, land management and (hydro)geomorphology in Ethiopia over a time span of almost 80 years, the first results of which will be presented.