Outcrop analogues are often used to aid understanding of subsurface rock geometries and deformation. For fold-thrust belts field analogues play an important role in prediction of fold-thrust forelimb structures that are difficult to image seismically. Understanding the continuity of strata in forelimbs and the extent of damage is critical for determining trap geometry and viability. Further, the extent of deformation in carbonate reservoir formations may inhibit or enhance flow within the reservoir, with implications for the petroleum charge of, and production from carbonate reservoirs. Kinematic forward models of fold thrust systems (e.g. fault-bend fold, trishear) provide end-members for the possible kinematic evolution of fold-thrust structures. These kinematic models are however very limited, matching the broad geometries of some structures, but do not effectively predict smaller scale deformation features, or the damage seen in many field analogues. The French sub-Alpine chain has been used as an analogue for carbonate fold-thrust systems. The chain is dominated by a 200-300m thick Urgonian limestone key bed, beneath which carbonates, of different geomechanical characteristics, are inter-bedded with more ductile shale units. 3-D models of large tracts of the fold-thrust belt have been created from satellite, map, well and field data. Analysis of the 3-D models has been combined with detailed studies of specific fold-thrust forelimb outcrops. At these forelimb field-sites investigation of the main deformation mechanisms and formation damage at a range of scales has been made. The field studies are compared with kinematic model predictions of deformation based on the 3-D models. The mechanical stratigraphy provides difficulties in predicting structures and structural styles using simple kinematic models. Our combined modeling and field data raises issues in determining deformation mechanisms in carbonate fold thrust belts and whether damage and fractures in fold-thrust fore-limbs can be predicted.