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Evolving interregional co-operation in flood risk management: distances and types of partnership approaches in Austria

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Abstract

Flood risk management and policy in Europe are changing, so the role of local and catchment-wide flood risk management plans are now key contemporary issues in flood policy. A new policy agenda is to enhance inter-local solutions instead of local flood alleviation schemes. This paper analyses the new role of those local authorities and stakeholders in flood risk management as well as how the nature of the partnerships are established and operate, focusing especially on the main barriers and challenges. This paper examines catchment-based flood risk management in Austria. Catchment-based flood risk management was analysed in three different Austrian regions (Aist in Upper Austria, Triesting-Tal in Lower Austria and Ill-Walgau in Vorarlberg). The current functions of a partnership approach in flood risk prevention lie within the selection of sites for conservation of regionally important retention areas, harmonising spatial planning instruments and awareness-raising for protective measures on an inter-local level. The empirical results are currently characterized by a lack of sufficient co-operation between the members as well as with the regional authorities. The three case studies show different backgrounds and developments. The results show that the inter-local co-operation process is in no cases fully achieved. Some of the case studies show a higher integration in one field than others.

Key words: partnership; flood risk management; governance; institutional arrangements; decision making; responsibility sharing

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1. Introduction

Losses from extreme hydrological events, such as those recently experienced in Europe have focused the attention of policy makers as well as researchers on questions of vulnerability reduction to natural hazards. This has led to an increasing discussion about changes beyond a focus on vulnerability and flood risk in isolation (Fuchs et al. 2013) to include such issues as climate change and dynamic forces of exposed societies (Keiler et al. 2010; Birkmann et al. 2013). The context of changing flood risks under climate change is driving a transformation in the role of the central government in terms of responsibility sharing and individual responsibilities for risk management and precaution (Adger et al. 2013; Mees et al. 2014). Recent developments have led to a re-arrangement of roles and responsibilities of the central government and towards the individual households for flood risk management (Thaler & Priest 2014). Emerging flood risk strategies place the lead responsibility with *local* organisations to determine *local* strategies to manage *local* risks which demand societal transformation in vulnerability reduction (Fuchs 2009; Fuchs et al. 2011; Driessen et al. 2013). This re-arrangement, with the creation of new roles and responsibilities for private-public actors and citizens, has been driven by various developments including: recent financial and economic crises (Thaler & Priest 2014), implementation of new legal requirements, (such as the European Water Framework (WFD) or Floods Directive (FRMD); European Commission 2000; European Commission 2007), recent flood events, (such as the 2002 and 2005 floods in Austria, 2002 floods in Germany, or 2007 floods in England; Fuchs et al. 2013; Thaler & Priest 2014) or due to concerns about the future impacts of climate change (Keiler et al. 2010). These changes suggest that policy agendas should enhance the responsibilities of different actors and stakeholders (governance arrangements) in flood risk management and reduce the controlling role of central governments and as such implies a new contract in the relationship between the different actors (Pearce & Ayres 2012; Adger et al. 2013).

Inter-local catchment-wide partnership development in flood risk management is one response to these ongoing challenges (Haupter et al. 2005; Hartmann 2011; Thaler 2014). A flood risk management approaches of this nature recognises a broader view of the management of a catchment as an integrated management system and therefore requires a greater interaction between different stakeholders at the local, regional and national level. A key aim is consensus building between the different groups (Margerum 2008; Berkes 2010) and aspects involve 'inclusion, power-sharing and joint decision-making' (Berkes 2010, p. 492) as well as 'an interaction of equals, rather than a subject-object relationship' (ibid: 492). However, the literature shows a gap in the assessment and the evaluation of various types of inter-local co-operations in flood risk management; including the influence of distance or proximity in the partnership performance. The use of proximity opens a new discussion to analyse

the engagement and interaction of actors and stakeholders in the politics of flood risk management. The aim of this paper is to address this gap by using multiple case studies to describe and discuss how different types of co-operation interact and influence the policy-decision practices in flood risk management. A resulting a conceptual framework is provided to analyse the dynamics in spatial developments and policy. In particular, the concept of proximity has permitted an analysis of the interaction between the different actors and stakeholders involved in partnership arrangements (Zeller 2004; Moodysson & Jonsson 2007; Lundquist & Trippl 2013).

This paper is divided into two main parts. The first part provides a short overview and analysis of the existing literature, which provides the context for the development of an analytical conceptual framework. The second part analyses and assesses empirical results. The empirical results demonstrate the performance the engagement and characteristics of partnership arrangements in flood risk management.

2. Theoretical background

Partnership arrangements and their performance are heavily influenced by the quality of engagement and therefore the interaction between the different actors and stakeholders. This interaction is, in turn, strongly influenced and defined by the institutional framework (Torre & Gilly 2000). In particular, flood risk management is based on a mix of technologies and funding strategies, knowledge, spatial and land use management, qualifications and skills needs by different organizations involved in the management system. The engagement between different members in the co-operation strongly depends on the distance (proximity) between the actors and stakeholders (Lundquist & Trippl 2013). The concept of proximity is well known in the regional innovation literature (Zeller 2004; Boschma 2005; Moodysson & Jonsson 2007; Huber 2012; Lundquist & Trippl 2013) and this research presents a first attempt to transfer this analytical concept to the sphere of flood risk management.

2.1. Concept of proximity in flood risk management

Torre & Rallet (2005) defined proximity as ‘not only means being near him/her, but also means having a strong complicity within a person who is geographically distant, whether that person belongs to the same circle of friends, family, or even to the same network’ (ibid: 48). However, in the context of flood risk management there is the need to deconstruct the concept further and consider a range of different elements.

First, spatial proximity refers to the aspect of physical distances (in km, time, and money; Boschma 2005; Lundquist & Trippl 2013). The physical distance refers to the geographical units (in terms of km) as well as the

ability to arrange face-to-face meetings between the members. Concerns related to spatial proximity include transactions costs (e.g. transport costs), whether it is possible to arrange meetings as well as the possibility to monitor the efficient use of resources. Indeed informal meetings have an important role within the effectiveness of inter-local co-operation and physical distance fundamentally influences the frequency and attendance of such meetings. Balland (2012) described the physical distance as the 'simplest' form of analysing the spatial proximity; however this is not a complete view. Spatial proximity also refers to the political boundaries between the different actors and stakeholders, for instance district or regional boundaries. Political boundaries play an important role within the delivery of flood risk management as different activities are undertaken according to different boundaries: such as local boundaries for spatial and land use management, district boundaries for emergency management and regional boundaries for flood risk management policy.

Second, institutional proximity refers to regulative, normative, and cognitive aspects (Zeller 2004; Moodysson & Jonasson 2007). Institutions determine the 'rules of the game in a society or, more formally, are the humanly devised constraints that shape human interaction' (North 1990, p. 3), consisting of norms and rules (formal legal and informal social). These rules govern individual behaviour and structure social interactions. Furthermore, North (1990) suggested that 'institutions include any form of constraint that human beings devise to shape human interaction' (ibid: 4). Institutions are highly important for economic development, because they regulate the social and economic behaviour of individuals. An institution creates stability (economic and political) over a certain period. Schmid (2004) suggested that 'institutions enable individuals to do what they cannot do alone' (ibid: 1). The task of the institution is to organise structures, which optimise social and economic behaviour for example by reducing uncertainty (North 1990; Hodgson 2006). As we shall see, institutions have a direct influence the behaviour of individuals (top-down), but the opposite is also true and that individual behaviour and habitation are a key driver for the development of new institutions or the change of actual institutions (bottom-up; Hodgson 2006). In summary, institutions define rules or procedures which support the decision-making process. Furthermore, rules can be formal or informal, which influence individual behaviour, e.g. laws, social norms, traditions, juridical decision, and administration practices (Raschky 2008).

Third, social proximity is strongly interrelated with the aspect of spatial proximity. Social proximity refers to the aspect of social relationship between the different members, i.e. interpersonal linkages such as friendship (Balland 2012; Huber 2012). It strongly refers to the aspect of trust, which is a key factor in the inter-local co-operation process (Balland 2012).

Technological proximity expresses the shared understanding of technological experiences, knowledge and expertise. Technology is a critical element and challenge for flood risk management. The adoptions of new technologies are strongly linked to the willingness of public administration and stakeholders to implement and to use the new technologies. In addition, the implementation of new technologies requires adequate structures, human resources, appropriate skills and knowledge (Hansson et al. 2008). The key arguments are that traditional, structural flood protection measures (e.g. dykes and dams) cannot completely eliminate flood risk (IPCC 2012). Traditional flood protection is now viewed more critically, especially from the society due to possible negative impacts to the environment or failures, like breaching or overtopping the defences. In addition, shifts in economic policies (e.g. fiscal squeeze) require the development of new technologies to reduce the costs. In general, modern flood risk management is a combination of structural and non-structural measures (Meijerink & Dicke 2008; Holub & Fuchs 2009). An important aspect is the adoption of broader suites of flood risk measures; including the coordination and combination of structural measures, preventive measures and operated measures during flood events (such as appropriate land use, early-warning systems, improved public/private/population communication). However, these new portfolios require integrated and comprehensive action plans (Kubal et al. 2009).

Finally, relational proximity is based on the concept of social capital and common language, as well as individual judgment (shared experiences and community interpretation, Bourdieu 1986; Coleman 1990; Zeller 2004; Boschma, 2005). The key aspect of the inter-local co-operation concept is the personal relationship between different members. Zeller (2004) defined relational proximity as 'informal structures that reinforce or counteract the effects of the formal organisations' (ibid: 88). Furthermore, it refers to the concept of 'interpretative communities' (Grabhar 2001; Zeller 2004), which 'transform "noise", rumours, impressions, and recommendations into valuable interpretations' (Zeller 2004, p. 87). In addition, relational proximity includes the aspect of 'similarities' between the different stakeholders, e.g. common communication, understanding and language (Huber 2012).

2.2. Different types of inter-local co-operations flood risk management

To translate and analyse proximity discourse within flood risk management, a heuristic-analytical framework (table 1) is used. The conceptual framework draws on previous work by Lundquist & Trippl (2013) and is composed of a progressive model including three main types of performances: type 1 (inadequate integration), type 2 (semi-integration) and type 3 (full integration). Each type will now be discussed in more detail.

Type 1 (inadequate integration): weak interaction is shown between the different members in a flood risk management partnership. Key problems include the physical distance between (functional proximity), a low degree of trust (social proximity) or lack of benefits from the co-operation. A key barrier in the inter-local co-operation, for example, is lock-in (decision-making) at local level, the fear of losing competences, power and limitations of self-governing (Weichhart 2006). Further hindrances are the high degree of competition between the different communities and regions, especially in relation to public funding and new businesses investments (Amdam 2001; Hagspiel 2001). Additionally, often there is no clear definition of how to share responsibility between the different actors and stakeholders as well as unequal-asymmetric power sharing (Hagspiel 2001). Finally, a key barrier is the uncertainty regarding future developments. In general, 'large' communities (in Austria mainly communities in the lower part of a catchment) are more likely to co-operate with other communities, because of the cost savings based on the economics of scale effect as well as due the possibility to get a flood defence scheme without increasing the role of the neighbourhood communities. On the other hand, studies show that 'small'-peripheral communities react more skeptically towards an inter-local co-operation process, because they fear to lose the identification and self-governing independence (Weichhart 2006; Wirth & Biwald 2006). Besides, rural (periphery) communities are often too 'weak' to start an inter-local co-operation process as they fear additional costs to the public budget (Weichhart 2006). The consequences are interdependences between 'small' and 'large' in defining objectives and goals instead of a common vision. The results are strong conflicts between the different actors and stakeholders. This includes a relatively low willingness for co-operating (Lundquist & Trippl 2013). In general, harmonisation and the use of non-structural flood defence measures (such as such as inter-local spatial and land use management strategies) are secondary goals. However, different actors and stakeholders recognise individual benefits of inter-local co-operation.

Type 2 (semi-integration): goes a step further. The physical distance is less important, because the different actors and stakeholders know each other. However, the harmonisation between the different actors and stakeholders is not fully integrated, in particular the spatial and land use management or emergency management plans. In this type of co-operation decisions are based on given political-institutional barriers. Regarding non-structural measures, we observe a first harmonisation of the management plans between neighbourhood communities or at the district level, e.g. through exchange of information. Furthermore, inter-local co-operation in flood risk management, for example, focuses on the implementation of inter-local structural measures, e.g. runoff management in the catchment.

Type 3 (full integration): includes the full integration between the different actors and stakeholders in a partnership approach. The ideal is the introduction of co-production in flood risk management and planning system (Albrechts 2013). We assume this as the final step in the partnership process. The focus for inter-local co-operation, for example, is about the implementation and maintenance of structural measures as well as full harmonisation of non-structural instruments, such as for instance spatial governance approach and catchment-based emergency management plans. The different actors and stakeholders exchange information (e.g. round tables, meetings) about their developments, objectives and concepts. A key objective is the use of a mix of different management instruments to reduce the impact of future flood events. A further important issue is the need to avoid contradictory policy directions in the inter-local co-operation. Within this type social learning is recognized as an important consideration. In this ideal case, the partnership approach includes a full democratic and transparent system to ensure accountability and legitimacy.

Table 1 provides a framework through which to analyse the integration of the different actors and stakeholders in various themes in flood risk management. In total, we selected four criteria, which have key functions to flood risk management, to compare the selected case studies.

[insert Table 1 around here]

3. Method and case studies description

This paper demonstrates and tests the outlined conceptual framework, which was applied to three contrasting case studies in Austria. The aim was to interpret and explain the differences and commonalities between the selected case studies to provide a holistic understanding of the interplay between different local and regional actors and stakeholders in inter-local flood risk management co-operations. The research method applied in this paper was centrally focused on a qualitative research design and based on semi-structured interviews to collect new data (Walker 1985). Each interview was transcribed and analysed using a systematic process of open and selective coding adopting a grounded theory approach to data analysis (Strauss & Corbin, 1998). In total 29 stakeholders were interviewed with different background and experiences in inter-local flood risk management co-operations in Austria and comprised a mix of public authorities, other relevant stakeholders including community representatives and academics. The selection process focused on the involved key decision-makers (national, regional and local level) from the case studies (Somerville & Haines 2008; Kramer & Revilla Diez

2012). The selection processes of the interviewees was based on networks, recommendations from other interviewees and academics and especially from newspaper articles, academic journals and internet websites. Semi-structured interviews complemented the policy analysis undertaken to better understand current policy documents, in particular background information and also how flood risk management works in practice. Therefore, all relevant documents and legislations in relation to flood risk management in Austria at the national and regional level were reviewed to analyse the institutional frameworks of policy interactions. The advantages of these techniques were to understand the general framework of the role of the different actors and stakeholders, which is socially and practically significant (Wildavsky 1969).

3.1. The Austrian flood risk management system and selected case studies

Austria is a Federal Republic with official responsibilities for flood risk management being divided between the Federal Government level (i.e. national government authorities); the nine state governments (i.e. regional government) as well as municipalities (local authority government). Austrian legislation includes a wide range of different laws relating to flood risk management. In general, the Austrian legislation, based on the federal structure, distinguishes between national and regional acts. At the state government level, different acts exists, which set out the rules for actors, regarding spatial and land use management as well as emergency management and disaster compensation (Kanonier 2006; Holub & Fuchs 2009). However, these different acts are not harmonised or co-ordinated between the different state goverments (Holub & Fuchs 2009). This means that there are a wide range of different interpretation and legislative requirements between the different state governments. In spatial and land use management, for example, a spectrum of different legal requirements can be observed between acknowledging the flood hazard to ignoring it in spatial planning activities (Kanonier 2006). In general, at the federal level, the national authorities "Austrian Service for Torrent and Avalanche Control" and "Federal Water Engineering Administration" have the responsibility for preventative flood risk management in Austria (Austrian Government 1975; 1985). The Federal Water Engineering Administration, in contrast to the Austrian Service for Torrent and Avalanche Control, are under direct control of each State Government, with the consequence that both organisations act at different administrative level (Austrian Service for Torrent and Avalanche Control at the national level and Federal Water Engineering Administration at the regional level). The local authorities have the responsibility for spatial and land use management plans as well as emergency management for local events. However, the State Government (Department for Water Engineering Administration and Department of Spatial Planning) and the Austrian Service for Torrent and Avalanche Control have the legal right to provide advice for new residential and non-residential developments

(Holub & Fuchs 2009). This paper selected three case studies in three different state governments to analyse the differences and the commonalities in inter-local flood risk management co-operations (figure 1). In the following sub-sections, we will provide an in-depth description of each case study.

[insert Figure 1 about here]

3.1.1. Ill-Walgau

The Ill-Walgau catchment shows a long tradition of river regulation. Since the 1820s, the various communities close to the river changed the river flows for agricultural and industrial purposes. Key objectives in this area are economic growth and prosperity. In the past 20 years, the Federal Water Engineering Administration in co-operation with the local authorities started to implement various flood protection measures alongside the river; with many aspects driving flood risk management and its nature. The implementation of protection measures was initiated in part as a direct response to recent flood experiences (e.g. 2005 floods) and in particular the pressure from downstream communities to reduce the flood peak in the lower part of the catchment. Therefore, the Federal Water Engineering Administration has introduced river development schemes to achieve a more holistic view of the catchments; integrating environmental and ecological sustainability with flood risk management priorities. The river development schemes include three key objectives. The first objective refers to the implementation of the WFD. The programme of measures includes various steps to increase the river continuity in order to achieve the ecological requirements from the WFD. Additionally, the river development schemes include the objective of increasing the fish passability in the catchment. A second objective is to increase the biodiversity in the catchment; such as the re-naturation of the river banks. The regional authorities in the case of Ill-Walgau, for example, created wetland areas in the community of Göfis with the key objectives to increase the biodiversity and to reduce the flood peak for the neighbourhood communities. A third objective refers to the implementation of retention basins in the catchment to reduce the flood peak. The river development scheme includes the implementation of five retention basins in the upper part of the catchment. The first project includes the communities Bludenz and Gais with four retention basins with a total volume of 600,000 m^3. The second project includes the communities Frastanz, Nenzing, Schlins and Satteins with a total volume of 1.2 million m^3.

3.1.2. Triesting

The Triesting region shows a long tradition of implementing structural flood defence measures. The key focus was the implementation of local-linear structural measures. After the recent local flood history in 1991 and 1997, the main strategy was to repair linear defence measures. Following the change in leadership in the regional authorities and the use of new instruments (e.g. regional studies), the flood risk management strategy shifted towards a more holistic catchment approach. The new flood risk management strategy has included the implementation of inter-local flood defence measures, such as retention basins. Since the 2000s the Austrian Service for Torrent and Avalanche Control has forced the communities in the catchment to use retention basins and natural retention ponds and lakes to reduce the impact of future events. The key strategies in this case study have therefore focused on the implementation of linear structural measures in the different communities as well as runoff reduction measures in the upstream catchment.

3.1.3. Aist

The Aist catchment, in contrast to the other two case studies, shows a low degree of river regulation. After the flood event of 2002, the strategy foresees a holistic view of the catchment with the key purpose to implement 25 retention basins across the catchment to reduce the flood peak. The study includes a different range of runoff management schemes. The first step includes the implementation of local flood defence measures. Here, communities are responsible for the implementation. However, the inter-local co-operation is paying the necessary partnership funding. The second step includes the implementation of retention basins in the catchment. The study identified 25 potential areas with a total retention volume of approximately 7.5 million m^3. This includes a reduction of the peak flow from 350 m^3s^{-1} to 240 m^3s^{-1}. The total costs are estimated at 30 million Euros (4 Euros per m^3 retention). However, the greatest benefits will impact on the downstream community of Schwertberg with a total reduction of the peak discharge of 109 m^3s^{-1} (Puchinger & Henle 2007) with a timeframe of the next 30 years.

4. Results and Discussion

Table 2 provides an overview of the results and highlights that none of the three case studies have fully achieved a full level of co-operation (type 3) between the different members in the inter-local co-operations.

[insert Table 2 around here]

4.1. Spatial planning

This paper interprets spatial planning as institutional proximity, in particular the institutional barriers to co-operate in local spatial plans. Based on the shift in the natural hazards discourse, away from the engineering standard of technical protection schemes towards a broader integrated management, spatial planning has become popular in the flood risk management discussions (Porter & Demritt 2012). In general, spatial planning and land use management focus on the prevention of future natural hazards events, e.g. local protection and adaptation measures such as the designation of retention areas, flood proofing of new buildings or implementation of sustainable urban drainage measures (Holub et al. 2012; Porter & Demritt 2012).

The patterns observed in the table 2 show no strong integration between the different case studies (type 1 or 2). None of the case studies could be considered as being fully integrated in spatial planning. Flood risk management has little or no impact on the design of local land and spatial planning plans and strategies, because the key objective for the different case studies is the economic growth within the administrative boundaries (White & Howe 2004; Burby 2006; Cammerer et al. 2013; Pardoe et al. 2013). Further, the land use management and spatial planning plans have in general no link to their neighbourhood communities to resolve the problems of flooding. For example, analysing the interviews, the local authorities within the case studies show a low interest in co-operating within the field of spatial and land use management planning, because of the local parochialism and the preoccupation with economic growth, contrary to a regional governance solutions (Fürst 2003; Weichart 2006; Hutter 2007; Tempels & Hartmann 2014). The three case studies show weak preparations for coordination or harmonisation of local spatial and land use management plans. Further, the empirical results show that all three case studies have little interest in closing this gap, because of the increasing tax competition between the local authorities, which favours competition instead of rational collaboration (Greiving et al. 2008). An exception is Ill-Walgau case study, where the regional authorities introduced the 'blue zone' concept which has been implemented by the State Government of Vorarlberg since 2012. The key principle of 'blue zones' is to restrict land-use in areas needed for flood protection and thereby ensuring that the natural processes are able to function, for instance through ensuring natural retention areas. 'Blue zones' can be considered to be in part a top-down approach, where the State Government has specified and designated the areas relevant for hydrological processes.

In sum, the consequences of the lack of co-operation were that the case studies show no shifts in the spatial planning process from local based approaches to a catchment-based level. Further, there is a clear lack of openness within spatial planning thinking to a broader and more holistic view of the space as well as strategic-

long-term visions for the catchment in referring to the impacts of climate change. Institutional frameworks have not resolved this problem, despite attempts due to the lack of formal and informal rules and norms (Kanonier 2006; Holub & Fuchs 2009). For example, a remaining obstacle is the low involvement of the State Government in local spatial planning concepts in terms of an advisory role to control the spatial and land use management acts for flood risk management. On the basis of empirical results, the state governments in Upper and Lower Austria provide no pressure on the local authorities to develop catchment-wide spatial and land use management plans. Key reasons are the political overlapping of local politicians at State Government level. In Lower Austria and Upper Austria more than 78 %[i] of the members of the State Government have been representative of a local authority (current or past legislation), e.g. mayor, deputy mayor or members of the municipal council, with the effect of a strong position of local interests in the ongoing political discussion at regional level. This observation has strong implications for flood risk management, because the effects from the State Government towards floodplain development controls are strongly limited. Consequently, the local authorities define their own spatial development plans, often in conflict with the neighbourhood communities (Greiving et al. 2008).

4.2. Flood defence strategy

Flood defence strategy is understood as technological proximity (common understanding of technology, especially the combined use of structural and non-structural flood risk management strategies). Traditionally, flood risk management focused on local protection measures, such as building embankments or straightening the watercourse. The integrated flood risk management approaches recognise a broader view of the management of a catchment as an integrated management system (Posthumus et al. 2008; Thaler 2014). The three case studies follow a clear inter-local flood defence strategy. Analysing the catchment management plans, they encourage the achievement of multiple benefits from the strategic proposals, e.g. by increasing biodiversity or by improving the river continuity. With respect to flood risk management, the key goal in the different case studies is the implementation of retention basins in the catchment, which follows the new national policy. There are significant differences between the three case studies in the extent to which temporary retention basins have been adopted. Implementing retention basins has involved the temporal and unpredicted (in terms of which year and frequency) flooding of large land areas often use for other purposes. Analysing the interviews, the key barrier is the different interests (flood prevention benefit transfer to downstream communities and financial transfer to upstream communities) of each stakeholder which may complicate the decision process when ranking different options, e.g. ranking the implementation of the flood alleviation schemes. A key problem is that this policy option includes a safety benefit transfer from the upstream to the downstream communities. This involves

the positive discrimination of the downstream communities who were compensated at the detriment to the upstream communities who had their risk increased: i.e. a funding transfer from downstream to upstream communities (Hartmann 2011; Thaler 2014).

4.3. Stakeholder engagement

Stakeholder engagement is interpreted as institutional (possibility and barriers to engage in the decision-making practices) and social proximity (interpersonal linkages and trust between the different actors and stakeholders in the inter-local co-operation). Stakeholder engagement is interpreted as institutional (possibility and barriers to engage in the decision-making practices) and social proximity (interpersonal linkages and trust between the different actors and stakeholders in the inter-local co-operation). In the implementation process of new flood risk management strategies, the empirical results from all case studies highlighted the inclusion of further key stakeholders; including land owners and inhabitants in floodplain areas as well as those stakeholders who are indirectly affected by flood events or those who are paying for the costs of flood risk management. The interview analyses illustrate that the different stakeholder groups in the selected case studies are not homogenous, inside these groups exist a wide range of different interests and objectives, which reflect the multitude of stakeholders in the planning and decision-making practices (Reed et al. 2009; Green & Penning-Rowsell 2010; Tseng & Penning-Rowsell 2012). In general, the involved actors and stakeholders are those living at risk of flooding (directly affected by past events) or those living in the catchment or community but not living at risk (Green & Penning-Rowsell 2010). Examining the stakeholder engagement in the policy decision-process as well as flood risk management planning we can observe substantial differences between the case studies. A central problem is the lack of high institutional and social proximity. Analysing the interviews the involvement of private actors and stakeholders highlighted that the negotiation process was longer and more complicated as a result, because of the need and desire to include different interests (lack of social relationship between the different members (Balland 2012). This implicated that the networks created higher transaction costs, particularly due to the increase of communication processes between the members of the co-operation (Höppner et al. 2010). For example, the State Government of Vorarlberg spent around 1,200 hours in 2010 and the directorate of the Ill-Walgau co-operation around 800 hours in 2010. This of course has implications for resource use, however transaction costs are thought to reduce when a medium-longer term perspective is considered. A further recognized problem with stakeholder engagement was whether the full breadth of stakeholders were included (Green & Penning-Rowsell 2010). Commonly, the exclusion of private actors and stakeholders as a member of a partnership was due to a lack of political willingness to involve and to enforce

private actors and stakeholders to contribute. However, the influence of stakeholders in the flood risk management planning and decision-making practices also depends on the local capacity as well as trust and openness in the public administration. The risk of failure within the negotiation process is another concern especially during the re-organisation phase. The critical barrier to the development of inter-local co-operation is reconciling the different interests of each stakeholder (flood defence benefit transfer to downstream communities and financial transfer to upstream communities) and reaching a concensus about the most appropriate action and how the costs will be distributed. Castells (1977) described this as one explanation 'why the membership of groups is not stable' (ibid: 78). Most of the different actors and stakeholders have strong interdependent interests, such as economic growth vs. restriction in land use management, which cause conflicts between them. Conflicts were observed to rise mainly due to funding, especially related to the amounts of the individual contributions. A key solution in the case studies has been the implementation of a 'fair' financial distribution between the different actors and stakeholders.

4.4. Risk communication

First, risk communication is defined as relational proximity (shared language and interpretation between the different actors and stakeholders). Second, the analysis of the risk communication structure is based on the published work by McCarthy et al. (2008) and Höppner et al. (2010). The data shows similar results between the different case studies in terms of the mode of communication, tools and purposes (table 3).

[insert Table 3 around here]

The most common communication process is that between regional authorities and selected members of the inter-local co-operation steering group (e.g. between the director and a chairman). This highlights that the mode of conversation favoured is, in general, that of few-to-few (Höppner et al. 2010). The dominating actors in the communication process are the technocrats from the national and regional authorities (Perkmann 2007; Thaler & Priest 2014). The main reasons for this are that these stakeholders lead the overall flood risk management process (planning, implementation, funding and co-ordination between the different actors and stakeholders) and have the technical knowledge and expertise (Thaler & Priest 2014). The nature of the leading stakeholders has a critical impact on the dominant types of communication (Habermas 1981; Höppner et al. 2010) and is important in defining the relationship between the local and regional level. As such, the interviews highlighted

that there were conflicts and barriers as well as misunderstandings between the involved parties in the decision-making process; in part due to the lack of a common language and confusion caused by the use of flood risk concepts. Stakeholders at the local level have difficulties in understanding the technical language, such as flood return periods, because the national and regional stakeholders utilise different approaches and concepts in flood risk management. A clear example of this is the use of different return periods for the standard level of protection (Federal Water Engineering Administration: 1:100; Austrian Service for Torrent and Avalanche Control: 1:150; Holub & Fuchs 2009). Furthermore, the interviews also recognised the importance of the same barriers (e.g. lack of technical knowledge and expertise and the lack of consistency in approach) in inhibiting the discussions between regional flood risk managers and local politicians. However, the implementation of the FRMD into national law requires some harmonisation between the approaches adopted by the regional and national authorities especially regarding the return periods and flood defence standards, which hopefully will go some way to addressing these barriers.

This use of technical language and a reliance on technical expertise knowledge has disadvantaged some local actors and stakeholders as it raises further questions about the transparency of the decision making process and the external communication process. For instance, interviewees at the local level in the Triesting-Tal inter-local co-operation displayed clear misgivings towards regional/national actors and stakeholders because of their use of expert language and technical concepts. Additionally, the results show a different level of information flow from the regional to the local authorities; with some individuals (i.e. members of the steering group) receive more information compared others with the resulting marginalization of some views. The reliance on a strong top-down communication approach is ultimately threatening the local acceptability of the flood risk management solutions as well as having a negative impact on the interactions at all levels. In particular, this has been a clear obstacle to the empowerment of local actors and stakeholders in the ongoing policy discussion.

The same situation is not observed in all case studies. In the case of Aist the communication process is more equally balanced. In this situation, local level actors collaborate with technical consultant companies to achieve a more ‘adequate’ educational-professional background and increase the skills and expertise at the local level. The Aist case study, in contrast to the other two case studies, includes a strong bottom-up approach in the development of the inter-local co-operation. The case studies highlight the importance of understanding the skills and expertise of all involved in the communication processes as well as the form of dialogue and modes of communication utilised on the outcomes and stakeholder/actor satisfaction. The misgivings and mistrust that

was being directed from the local level towards the national/regional authorities had a delaying effect on the process of flood risk management.

5. Conclusions

The paper analyses the inter-local co-operation in flood risk management in Austria. The empirical results are currently characterized by a lack of sufficient co-operations between the members as well as with the regional authorities. The three case studies show different backgrounds and developments. The results highlight that the inter-local co-operation process is in no case fully integrated and achieved when compared to an ideal (table 1). Some of the case studies show a higher integration in one field than others. However, the level of co-operation especially in spatial and land use management is very low. Nevertheless, the regional authorities have to force the members of the inter-local co-operation to increase the co-operation. Furthermore, the interviews show strong barriers and conflict in the discussion between regional professionals and local politicians, based on lack of technology knowledge and expertise (politicians), but also lack of a common management approach between the Federal Water Engineering Administration and Austrian Service for Torrent and Avalanche Control.

Despite the problems highlighted, inter-local co-operation, can be seen as an ideal instrument for stakeholder engagement in flood risk management. Throughout, with current pressures on local authorities to reduce the spending and in parallel, a reduction in the central state's resources, inter-local co-operation has been seen as a possibility to both increase the 'value' of budgets available and to increase efficiency in using current public funds and resources. In respect to small communities, the inter-local co-operation approach is the only possibility to realise any flood defence measures. Furthermore, inter-local co-operations may allow direct and indirect benefits including harmonisation of spatial and land use management plans. Nevertheless, besides the advantages of inter-local co-operations, the results listed a wide range of potential risks and disadvantages. In general, inter-local co-operation is not a 'business as usual' situation for the different members due to the high risk for each member. Firstly problems related to a fair sharing of power between the different actors, usually 'large' communities manage the local actors and stakeholders. The consequence is that 'small' members often have less power in the overall decision process. A key aspect is to reduce the power of 'large' members, (e.g. super-majorities) for certain decisions. A second problem refers to higher transaction costs, especially in over the short term. In sum, the Austrian flood risk management policy at regional level favours formalised sub-catchment flood risk management plans, contrary to other European countries, although there is also a strong reliance on the regional government to enable this. Therefore, policy should try to encourage co-operations to take over more responsibility, close the gaps and barriers and strengthen co-operation between local and

regional authorities such as by increasing trust between the different local actors and stakeholders and increasing awareness of the problems. In many situations members have not acknowledged the benefits from the co-operation, which has resulted in contradictory policy directions.

The development of local partnership arrangements between upstream and downstream communities from the examples shows a strong potential for the successful implementation of European Floods Directive or, in general, to reduce flood vulnerability within the catchment. To achieve this, partnership developments, the national and regional authorities play the central role in the policy on flood risk management. They are the key actors in the policy discussion and definition. Main reasons are their technical knowledge, their central role in funding and their permission power. Overall the local actors and stakeholder strategically depend on the national and regional authorities. The national and regional authorities are leading the design and development of flood alleviation schemes. However, their role strongly depends on the input from the local actors and stakeholders.

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[i] Own calculation: data based on Land Oberösterreich (2013) and Land Niederösterreich (2013).

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Table 1: Characteristics of different level of integration in the co-operation process

Flood risk management categories	Type of proximity	Spectra of integration		
		Inadequate integrated (Type 1)	**Semi-integrated (Type 2)**	**Full integrated (Type 3)**
Spatial planning	Institutional proximity	No harmonisation of local land use plans (high competition between the different local authorities)	Medium/high harmonisation of local land use plans between different local authorities, e.g. develop common business parks	High/fully co-ordination between communities within catchment, e.g. develop catchment-wide land use management plans
Flood defence strategy	Technological proximity	No co-operation between the different local authorities, e.g. preventive local-linear structural measures	Medium/high co-ordination between communities, e.g. implementation of flood storages in the upstream areas	High/fully co-ordination between communities, e.g. implementation of common catchment management schemes, such as to improve infiltration rates (cross-field mould ploughing, improve soil structure, install water boreholes), to reduce flow connectivity (buffer strips, afforestation, flood storages)
Stakeholder engagement	Institutional and social proximity	No co-operation between private-public actors and stakeholders	Informal co-operation between private-public actors and stakeholders, e.g. asking for funding scheme	Full co-operation between public-private actors and stakeholders (companies and households), funding and steering group
Risk communication	Relational proximity	No communication between public authorities and non-state actors and stakeholders	Communication within the members of the partnership approach	Communication with internal as well as external stakeholders and citizens

Table 2: Integration and network engagement in the selected case studies

	Inadequate integrated (Type 1)	Semi-integrated (Type 2)	Full integrated (Type 3)
Relationship/Characterisation of integration (between local and regional actors and stakeholders)	Triesting-Tal	Ill-Walgau Aist	
Spatial and land use management	Triesting-Tal Aist	Ill-Walgau	
Emergency planning		Aist Ill-Walgau	Triesting-Tal
Flood defence measures		Aist Triesting-Tal	Ill-Walgau
Risk communication	Triesting-Tal	Ill-Walgau	Aist

Table 3 Risk communication in flood risk management in selected case studies

	Aist	**Ill-Walgau**	**Triesting-Tal**
Actors	WLV, BWV, local municipalities, consultant group, university, non-governmental group	BWV, local municipalities, private consultant group, utility companies	WLV, BWV, local municipalities, district (first phase)
Purposes	improve relationship, involve actors in decision making, increase knowledge		
Modes	few-to-few (regional authorities and members of steering group), communication between regional authorities, few-to-many (general assembly meetings), dialogical two-way	few-to-few (regional authorities and members of steering group), communication between regional authorities, few-to-many (general assembly meetings), dialogical two-way	few-to-few (regional authorities and members of steering group), communication between regional authorities, few-to-many (general assembly meetings)
Tools	flood risk assessment, flood modelling, meetings, scientific reports	flood risk assessment, flood modelling, meetings	flood risk assessment, flood modelling, meetings
Messages	expert-dominant, transparency (internal: yes; external: yes)	expert-dominant, transparency (internal: yes; external: partly)	expert-dominant, transparency (internal: partly; external: no)

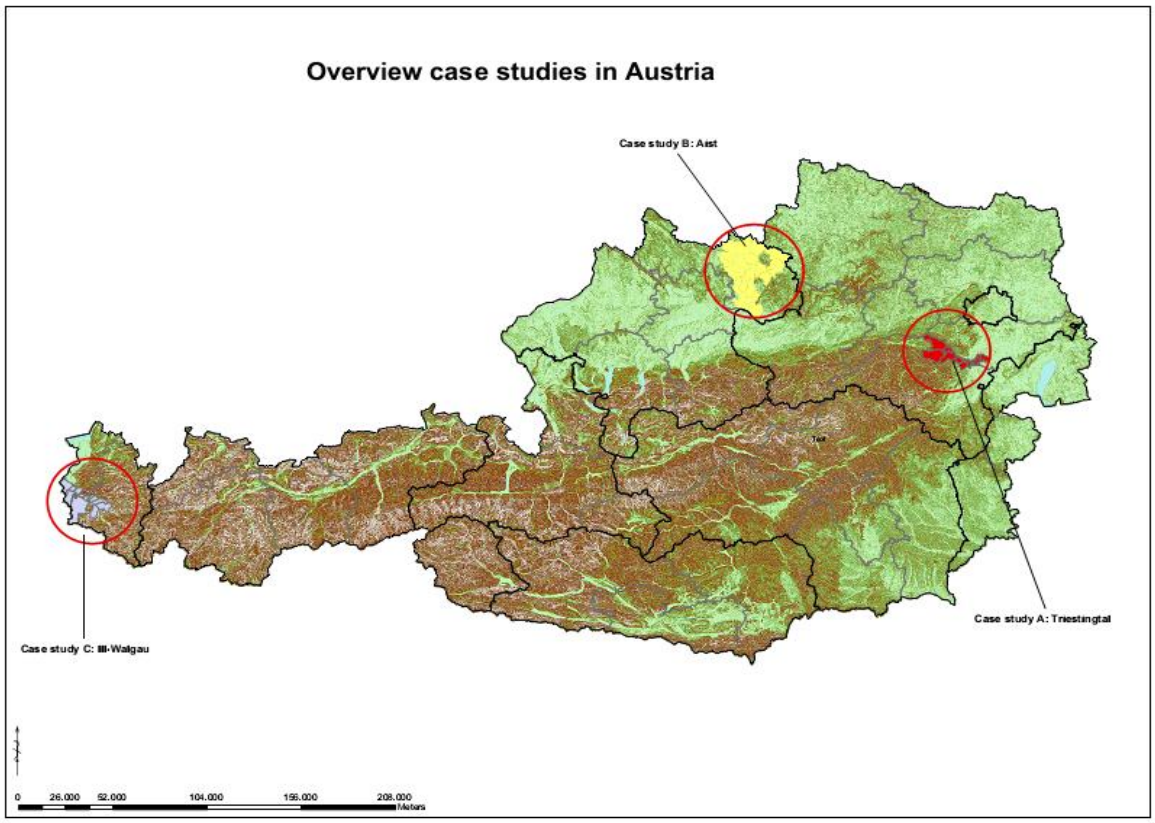

Figure 1: Selection of case studies