Routine reporting of environmental risk: The first traces of micropollutants in the German press

Abstract

This article analyzes the emergence of a new environmental issue in the German press. Since the 1990s, scientists have detected traces of pharmaceuticals, hormones and chemicals in all segments of the water cycle. These micropollutants have negative effects on aquatic life and might affect human health. Their sources are manifold and include private households. Yet although micropollutants of are direct concern to media audiences, they are a challenging topic for news reporting. Although this issue is systemic and fraught with uncertainty, it does not easily translate into news stories. Our content analysis of 444 articles (1995-2015) reveals that the societal risk was rarely presented as a stand-alone topic. Instead, the issue was mostly covered as part of local routine reporting and framed as a challenge for experts to solve. Over time, the reporting became more managerial, while media framings of micropollutants gained more substance and scope. We contend that local routine reporting should receive more attention as a public forum for addressing emerging environmental concerns.

Keywords: environmental reporting, journalistic norms, media framing, micropollutants, pharmaceutical residues.

We would like to thank the anonymous reviewers for their valuable feedback.

1. Introduction

Environmental issues are challenging for news reporting. They are often scientifically complex and fraught with uncertainty (cf. Anderson, 2013, p. 1). Moreover, their often subtle causes and consequences make it difficult to tell gripping news stories. "Think of non-point-source pollution and then think of the Exxon Valdez," writes environmental journalist Andrew Revkin and adds that many "daunting impediments to effective environmental coverage lie not out in the examined world, but back in the newsroom, and in the nature of news itself" (2005, p. 1). As a result, media tend to shape environmental issues in line with journalistic norms (Boykoff & Boykoff, 2007). This issue-shaping role is considered crucial "in democratic societies" where news media "spotlight and draw public attention to problems and situations that need solutions and repair" (Shoemaker, 2006, p. 108). It is especially relevant when issues are unobtrusive, "invisible" and lack "real-world experiential conditions that could help shape opinion and understanding" (Corbett & Durfee, 2004, p. 130).

Micropollutants are one such invisible issue that calls for solutions. The umbrella term stands for traces of pharmaceuticals, synthetic hormones, and other industrial chemicals in the water cycle that only became visible in recent decades thanks to advanced water monitoring techniques and methods (Ternes & Joss, 2007, p. 3). Since the 1990s scientists have found such traces "ubiquitously in natural waters" (Schwarzenbach et al., 2006, p. 1073). They have also shown that traces of hormones and pain killers have toxic effects on aquatic organisms. Health effects on humans have not been proven, but cannot be ruled out. Although precautionary measures seem wise, there are no obvious solutions to the problem. Micropollutants do not result from specific sources or accidents, but from diffuse sources and mundane practices of consumption and disposal that are hard to tackle. Since conventional wastewater utilities cannot hold them back, they enter the water cycle on a daily basis via human urine, household wastewater, hospital and industrial sewage, and also rain water. The contamination might also accumulate and intensify due to demographic change and an increasing consumption of medicine and industrial chemicals. Micropollutants thus concern society as a whole and the media can play an important role in communicating the problem, justifying solutions and creating a forum for public debate (Dunwoody & Peters, 1992, p. 206; Jönsson, 2011).

This article focuses on the German press coverage of micropollutants and asks *how the issue has taken shape since its first news appearance in the 1990s*. Experts in Germany have long been aware of the problem (Ternes & Joss, 2006). In the period under analysis, 1995 to 2015, possible solutions were already being trialed yet discussion of those solutions was still controversial, making the German press coverage a particularly salient empirical case. It is also

interesting from a theoretical perspective, as two previous analyses of German media found that the issue was presented in non-alarming and rather neutral ways (Baur & Wenzel, 2015; Sunderer, Götz, Storch, & Hagenkamp, 2014). This seems at odds with jounalistic norms like novelty, drama and personalization (Boykoff & Boykoff 2007) and raises the question: What made micropollutants a newsworthy topic in the first place? Furthermore, our analysis not only identifies the themes and reporting styles in existing accounts of micropollutants in new reporting, but also investigates how the issue was framed by the media. By examining a 20-year period, our study was able to reveal shifts in the framing of this emerging issue in the German press. In particular, we found that more recent articles make the readers' role in the problem more explicit.

Based on this analysis, we better understand why the German press tended to cover micropollutants in the water cycle in a non-alarming way (cf. Baur & Wenzel, 2015; Sunderer et al., 2014). Conceptually, we demonstrate that the issue was not primarily shaped by journalists in search of sensational news, but rather framed through institutionalized routine reporting.

In the following sections, we first describe the emerging environmental risk in more detail (2) and outline our theoretical assumptions and the results of existing studies on micropollutants (3). We then explain our methods of data collection and analysis (4). The presentation of our key findings (5) is followed by a discussion of our results (6). We conclude with some practical and conceptual implications of our study (7).

2. Micropollutants in the water cycle: An issue of emerging concern

In the past decades, the quality of German surface waters has improved continuously and the quality of drinking water has been rated as "very good" (UBA, 2015). Nevertheless, a new potential problem is looming. In the 1990s, improved analytical tools revealed that the presence of chemical trace contaminants "is rampant in surface waters" (Sauvé & Desrosiers, 2014, p. 4-5). The European Commission (2016-10-07) states that "micropollutants—small, persistent and biologically active substances—are found in aquatic environments all over the world and can have negative effects on plants, animals and humans." The U.S. Environmental Protection Agency refers to "contaminants of emerging concern" (US EPA, 2008).

The emerging political concern does not imply that micropollutants are a new phenomenon. In fact, it was a "revolution" in environmental analysis that made micropollutants detectable "in all kinds of waters" as well as soil, sludge and sediment (Ternes & Joss, 2007, p. 3). Yet these

residues of pharmaceuticals, hormones from personal care products, and industrial chemicals or nanomaterials from textiles have long been entering the water cycle via our wastewater and excrement. Standard water treatment procedures cannot filter them out. Given that these residues are often persistent, they accumulate and spread easily throughout the water cycle. This accumulation might intensify due to the ageing, affluent German society, which releases more chemical residues into rivers that carry less water due to climate change.

Micropollutants raise toxicological concerns, despite their very low concentrations. Pharmaceuticals and other bioactive substances are explicitly designed to have effects at trace concentrations (Snyder, Westerhoff, Yoon & Sedlak, 2003). Toxicologists are only beginning to understand their neurotoxic, carcinogenic, immunotoxic, and endocrine effects on water organisms, and the reproductive and developmental damages they can cause (Escher et al., 2013, p. 1941). The scientific challenge is even greater as trace contaminations also react, transform, degrade and mix in aquatic environments, forming potentially poisonous cocktails (Altenburger, Walter & Grote, 2004). Thus, political action is "hampered by the rudimentary eco- and toxicological assessments" (Gerbersdorf et al., 2015, p. 86).

The high degree of scientific uncertainty and the impossibility of clear-cut risk assessments make it difficult to regulate or justify the costs of countermeasures. The European Commission is still only monitoring the most conspicuous pesticides and PPCPs on a watch list of potential priority substances in order to "determine their environmental risk" (European Commission, 2016-10-07). Tackling the problem at its source is difficult as micropollutants are inextricably linked to everyday routines, healthcare and desirable living standards and enter the water cycle via heterogeneous paths. In particular, hospitals and households are important sources of pharmaceutical residues (Herrmann, Olsson, Fiehn, Herrel & Kümmerer, 2015). But nobody wants to pit human and public health against potential environmental risks, and the substitution of pharmaceuticals with "green pharmacy" is costly and time-consuming (Behrendt, 2017; Kümmerer, 2010). Reducing the use of antibiotics in livestock farming or the use of harmful pesticides, lifestyle products or industrial chemicals is also challenging. Micropollution could be reduced by infrastructural refurbishments in the form of an additional fourth "end-of-pipe" purification stage in wastewater treatment plants, but they are costly, energy intensive and their positive ecological effects are hard to measure (Behrendt, 2017). Despite these obstacles, in 2014 the Swiss parliament decided to equip all large wastewater treatment plants with a fourth purification stage to eliminate trace substances (Bundesamt für Umwelt, 2012). These precautionary measures are flanked by monitoring and efforts to tackle the sources of the problem and have shown positive results (ICPR, 2017, p. 34). In Germany, the problem of

micropollutants was also recognized early on (Ternes & Joss, 2006). Yet while precautionary measures are being tested, there is still no federal strategy and expert debates are ongoing. Several research projects were launched to test the effectiveness and feasibility of purification technologies, especially in the federal states Baden-Württemberg and North-Rhine Westphalia. In 2012, both states also established competence centers for micropollutants (KomS BW, 2012; Mikroschadstoffe.NRW). At the national level, the federal government has initiated a participatory strategy process, however proposals for mandatory infrastructure upgrades and financing schemes are controversial (Gawel, 2015). Water management experts and politicians seem to agree that micropollutants call for a "multi-barrier approach" including measures "end-of-pipe" and at the sources of pollution (UBA, 2017). While this reflects the systemic nature of the problem, it also opens a space for negotiating measures and responsibilities. Here, the media can play an important role by turning "invisible" expert concerns into public issues (cf. Hird, Lougheed, Rowe & Kuyvenhoven, 2014) and sensitize their audiences both as potentially affected water consumers and water polluters.

3. Emerging environmental issues as a media challenge

Mass media shape public awareness of environmental risks in decisive ways. Public perceptions also have implications for the governance of water-related issues (cf. Jönsson 2011). As Doria argues, "changes in the social role of science, complexity and uncertainty, contributed to the emergence of the general public as an important actor in water management" (2010, p. 1). Yet he also suggests that public perceptions of water-related risks depend on many factors, including the local water supply situation, the aesthetic appeal of water, personal sources of information and mass media. Surveys show that media audiences in industrialized countries are interested in water-related information, making it "a particularly good topic for the media to explore" (ibid, p. 8). Nevertheless, while water quality is a well-established topic in the media, articles on micropollutants are still scarce and so are media studies on the topic.

Micropollutants in the media

Two German media studies focusing on micropollutants were carried out as part of larger interdisciplinary research projects on anthropogenic micropollutants and pathogens in the water cycle. Both studies suggest that micropollutants are primarily a subject for local reporting in Germany. In their analysis of 126 newspaper articles (published between 01-2012 and 06-2013 in the federal states Berlin and Brandenburg), Baur and Wenzel revealed that micropollutants "attracted only very little media attention" and were mostly addressed in the regional sections

of newspapers (38%). They contend that this result "is not surprising as water is a regional product" and "almost exclusively affected by regional factors…" (2015, p. 27 and 20). A study by Sunderer and his co-authors (2014), which covers 270 newspaper articles published throughout Germany (2000-2012), confirms the local relevance of the topic. The study found that 31% of articles about micropollutants were published in the regional sections of the newspapers, while only very few appeared in the more prominent political and economic sections.

These studies also show that German newspapers presented the issue of micropollutants in a non-dramatic, neutral tone. The media coverage was "normally fact-based and only rarely lurid or downplaying" (Sunderer et al., 2014, p. 1). Negative environmental effects and potential health effects are mostly reported in a non-alarming style, sometimetimes even with a humorous tone. Baur and Wenzel report that "about half of the articles reported positively or neutrally about water-related topics" and only 19% were critical or negative (2015, p. 23). They categorized about half of the analyzed articles as "risk-based communication," e.g. articles about water management incidents or pollution events. The rest offer "follow-up" or "preventive information" (ibid, p. 21).

Sunderer and his co-authors further observed (2014, p. 14) that 44% of the articles in their sample address causes and effects, but do not mention solutions. Only 14% of the articles offered their readers concrete practical guidance on how to reduce the influx of micropollutants. The study concludes that this lack of information might hamper the readers' individual sense of responsibility and recommends that future communication strategies should strengthen public awareness.

However, while better communication seems like a no-regret strategy, it might not be as easy in practice. As Blair, Zimny-Schmitt and Rudd argue in their more recent study on U.S. media coverage of pharmaceutical residues (2017, p. 318), "the pre-eminent solution to mitigate pharmaceutical pollution presented by the news media is unclear" and reflects "the lack of a consensus surrounding pharmaceutical pollution mitigation strategies that are both effective and feasible." Based on their analysis of 81 articles in eight major U.S. newspapers (2007-2014), they show that U.S. newspapers referenced the various stakeholders in relation to different problem descriptions. Governmental actors were referenced most and addressed a variety of measures. Water utility actors speak about improved "end-of-pipe" water treatment technologies, which are also the most frequently coded solution (ibid, p. 318). The study concludes by highlighting the need for a long-term analysis with a greater data sample.

In sum, these descriptive analyses suggest that micropollutants are neither the hottest nor the most controversial media topic. They further show that causes, effects and potential remedies are mentioned inconsistently. What is lacking are insights or hypotheses regarding two questions: What made micropollutants newsworthy for neutral reporting and—given its presumably non-dramatic and inconsistent presentation—how was the issue framed in consistent ways?

Newsworthiness, media framing and its flaws

"Newsworthiness" is not inherent to "news"—it needs to be constructed (Shoemaker, 2006). Media research offers two lines of argument regarding how environmental risks become newsworthy. On the one hand, Boykoff and Boykoff (2007) argue that novelty, drama and personalization are decisive journalistic norms for constructing newsworthiness. On the other hand, Dunwoody and Griffin suggest that journalists need to make "speedy decisions about what […] is worth their attention" and therefore rely on institutionalized sources and *their* constructions of newsworthiness (1993, p. 24). Both principles have implications for the presentation of emerging environmental issues.

The concept of framing describes how the presentation of a new topic is shaped in a way that resonates with or adds an interesting new aspect to existing ideas. According to Entman (1993, p. 51) framing "consistently offers a way to describe the power of a communicating text." Media frames "set a specific train of thought in motion" and communicate "why an issue might be a problem, who or what might be responsible for it, and what should be done about it" (Nisbet, 2009, p. 15). They attribute responsibilities (Olausson, 2009) and "domesticize" intangible, global problems by placing them in local contexts (Brown, Budd, Bell & Rendell, 2011). As a result of this "active construction," some events are "presented as meaningful, and others are ignored or marginalized" (Dispensa & Brulle, 2003, p. 79). Media research often uncovers these flaws of media frames.

Boykoff and Boykoff (2007) problematize framing effects by pointing out that personalized stories—as opposed to structural, systemic or institutional explanations—can lead to "attribution errors," i.e. the media's tendency "to blame people rather than the system" (Wilkins, 1993, p. 74). *Dramatization* risks blocking out news that "does not hold an immediate sense of excitement or controversy," which might lead to trivialized representations of environmental problems (Boykoff & Boykoff, 2007, p. 1192) or alarmist accounts "rather than a constructive message" (Ereaut & Segnit, 2006, p. 14). Finally, *novelty* is the norm that is obviously most decisive for the selection of news. Since news is a commodity and not identical

with newsworthiness (Shoemaker, 2006), the novelty of news can be ahistorical, subjective and constructed (Gans, 1979, p. 168-169).

Based on this research, we would expect the media to present the emerging issue of micropollutants as a new topic with dramatic effects and to draw attention to personal consequences and responsibilities. However the analyses described above suggest the opposite—especially the German media studies.

The other line of argument suggests that journalists put little effort in shaping issues independently and instead adopt the frames that are communicated by their sources, thereby presenting events through the eyes of their main sources (Fishman, 1982, p. 224). Dunwoody and Griffin suggest that "reporters simply adopt the frames of references of the bureaucracies that they cover; a dimension of an issue will be deemed newsworthy because officials have defined that piece of the process as important" (1993, p. 46). Such routine reporting can be considered the "backbone" of daily news (Hannigan, 2014, p. 80), as it allows journalists and editors to plan their day and fill their pages by covering predictable events (cf. Fishman, 1980; Schlesinger, 1978).

The flaw in this routinized kind of framing is that it might uncritically reproduce experts' risk communication—including any blind spots. Dunwoody and Griffin argue that "this controller of story frames" can render environmental risks "invisible to the public" (1993, p. 46). Furthermore, Corbett and Durfee argue that journalists "have the discretion to pass along the caveats and uncertainty claims presented by the scientist or to exclude such claims" (2004, p. 134).

Taken together, the empirical studies and theoretical approaches outlined here suggest that micropollutants entered the press in a non-sensational way through routine reporting. We can also expect that the framing of the issue will largely reflect the media's expert sources, which may also result in flawed reporting. These insights form the starting point for our analysis of how the issue of micropollutants took shape in the German press and over time. Our focus on media frames allows us to explore the presentation of the issue in more detail and also in relation to its expert spokespeople.

4. Methods: Data collection and analysis

Since micropollutants are a recent and barely studied media topic, we chose an explorative approach combining a qualitative content analysis with descriptive statistics. In order to facilitate a longitudinal analysis, we tried to maximize the variety of German newspapers in our

sample as well as the number of articles. The Nexis® database was determined to be a suitable source of data, because it features a German Language News service that provides full-text articles from a stable set of media sources.[1] Most importantly, the database includes local and regional German newspapers that seemed most likely to cover our topic (cf. Baur & Wenzel, 2015).

Our data set was created using keyword searches based on terms like "micropollutants," "trace substances" and "pharmaceutical residues" (which are used almost synonymously) in combination with "water."[2] We considered *all* articles that were published by German daily newspapers in the Nexis database until December 31, 2015 in order to cover the period when the issue emerged in the German press and the study periods of existing press analyses (see section 2). This approach was also designed to generate sufficient material for a long-term analysis. (The number of articles in our sample almost doubled between 2013 and 2015, see Figure 1 in the next section.) In the data preparation process, we excluded off-topic articles that mention "micropollutants" in contexts that are not related to water contamination. The data preparation left us with a sample of 444 articles published between 1995 and 2015 in 50 different, predominantly local and regional German newspapers (Appendix 1).[3]

During our content analysis we examined and coded the full text of each article. The coding scheme was developed, tested and adapted in an iterative process during our exploratory analysis. Feedback loops and double-checking ensured the reliability of our coding (Mayring, 2000).

Codes were assigned on two levels. To operationalize newsworthiness on the article level, we identified the main *news focus* of every article and thereby also differentiated between articles that referred to micropollutants as their *main theme* or as a *minor theme*. To identify frames at the text level, we first coded the content of the articles in a grounded way (Mey & Mruck, 2010) and then matched our codes and code categories with Entman's (1993) conceptualization of frames and their elements.

[1] In our analysis we focused on daily German newspapers and excluded articles from Swiss newspapers, specialized media, news agencies, as well as a few articles from weekly magazines that are also in the Nexis® data set.

[2] The search words were: "Wasser AND Mikroverunreinigung OR Mikroverunreinigungen OR Spurenstoffe OR Spurenstoff OR Mikroschadstoffe OR Mikroschadstoff". Since trace contaminations are often almost synonymous with traces of pharmaceuticals (cf. Sunderer et al., 2014), we also searched for articles that referred to "pharmaceutical residues": "Wasser AND Arzneimittelrückstände OR Medikamentenrückstände OR Arzneimittelreste OR Medikamentenreste OR Arzneimittelrest OR Medikamentenrest OR Medikamentreste OR Medikamentrückstände NOT Mikroverunreinigung NOT Mikroverunreinigungen NOT Spurenstoffe NOT Spurenstoff NOT Mikroschadstoffe NOT Mikroschadstoff".

[3] This data corpus includes about 30 identical or very similar articles published in different media by the same publisher or on different days.

According to Entman (1993, p. 52), frames define *problems*, diagnose *causes*, make *moral judgments*, and suggest *remedies*; they offer and justify "treatments for the problems and predict their likely effects." This fragmented operationalization of frames has the advantage of preventing rash interpretations and fixations on frames that have already been identified. As Matthes and Kohring (2004, p. 59) point out, such fixations are particularly problematic in longitudinal analyses that are based on quantifying interpretative methods. We avoided coding fixations by identifying the frames based on a synthesis of their elements.

The framing analysis was performed on the 226 articles in which micropollutants was a *main theme*. The differentiation between *main theme* and *minor theme* was necessary, because articles that only hinted at micropollutants offered too little material for a frame analysis.

The content analysis was conducted using R statistical software and the RQDA software package for qualitative coding (Huang, 2018). The data documentation and descriptive statistics were prepared in Excel.

5. Traces of micropollutants in the German press

Historically, the problem of micropollutants in the water cycle has not been a prominent media topic in the German press. Our keyword searches did not produce any results for the period before 1995. Between 1995 and 2010, coverage of the topic was negligible. This changed between 2010 and 2015 (Figure 1). During that period, reporting on the topic increased almost continuously and the amount of reporting more than quadrupled. Nevertheless, the number of articles was still relatively small compared to other media topics,[4] which supports our assumption that micropollutants are not the hottest media topic. This became particularly clear during our analysis of the thematic relevance of the issue within the articles. Micropollutants were only a *minor theme* in about half of the 444 articles under investigation. Those articles only briefly mention micropollutants—in one sentence or in the very last paragraph of a page-long text—to spice up routine reports about water-related topics. The percentage of articles that treated micropollutants as a side issue remained stable over time. The following section examines the newsworthiness of the issue (news foci) and afterwards we explore how the issue was presented (media frames).

[4] To give a rough comparison, a search in Nexis® for the keyword "climate change" found over ten times more articles in 2015.

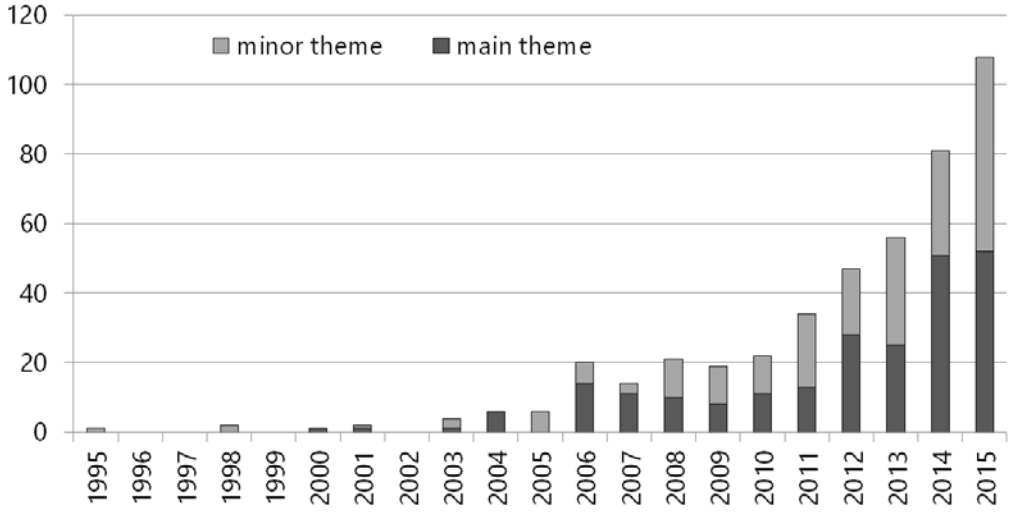

Fig. 1: Number of articles featuring micropollutants as a main theme or minor theme per year (n=444).

News foci: How did micropollutants enter the press?

By studying the article pegs, we found that reporting on micropollutants was often prompted by water-related public events and information (cf. Sunderer et al., 2014) that are routinely covered by local and regional newspapers. These include the annual reports and general assemblies of local water boards, information about the quality of the local lakes or drinking water, reports on political meetings, reports on the progress and insights of regional research projects, guided tours of communal wastewater treatment plants, or articles about World Water Day on March 22. These pegs mobilize specific water-related foci, regardless of the newspaper sections in which the articles were published.

In the coding process we identified *six article news foci* based on the pegs, article themes and the dominant spokespeople on the issue. The majority of the reporting focuses on micropollutants as a *water management* issue (29%, Figure 2) and raises the topic in the specific contexts of water treatment pilot projects, infrastructural refurbishments, and other activities carried out by regional water management boards. Articles with a focus on the *environment* make up another large share (24%). They often raise the issue in episodic ways, such as on World Water Day or in response to newly released water monitoring results or official water quality reports. Articles with an environmental focus are primarily concerned with water quality, including ground water, specific rivers and lakes, and sources of drinking water. They also discuss health and ecological consequences in different shades of uncertainty through the lenses of scientific and administrative actors. The *societal risk* focus was rather marginal in our sample (15%). It is nevertheless particularly relevant, because it is the only news focus in our analysis that addresses micropollutants as a new, newly recognized or intensifying societal

problem presenting it as a newsworthy issue in its own right. Articles with a *societal risk* focus quote scientists, politicians or water management experts and explain in a comprehensive way why readers should (not) worry about their drinking water, or environmental and health impacts. They also tend to highlight the uncertain, unknown or unpredictable future effects and solutions.

The remaining articles deal with the issue in more sociopolitical and sociotechnical contexts. Articles with a *science and technology* focus (15%) present micropollutants as a subject of scientific or technological research and development, often in relation to new analytical tools or new water treatment technologies. Articles focusing on *politics* (14%) address the issue as the subject of regulation, political decisions, debates and events at all political levels. These articles report on communal decisions or assemblies, initiatives by the governments of federal states and the German Federal Environment Agency (Umweltbundesamt UBA), as well as EU directives and activities related to micropollutants. Last but not least, 13 articles (3%) explicitly address problems of pharmaceutical waste *disposal*. These are very short and usually purely informative articles advising readers to not throw old medicine into the sink or toilet, but into the household rubbish, or to return them to a pharmacy.

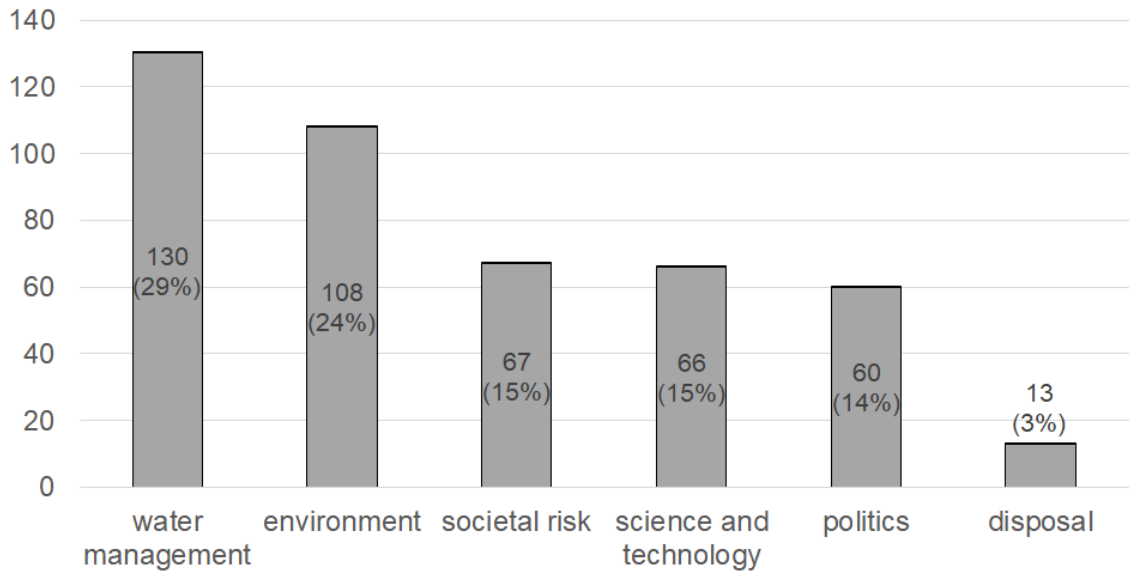

Fig. 2: Six foci on the micropollutants issue in absolute numbers (and in percentages) over the entire investigation period from 1995 to 2015, including articles that feature micropollutants as a minor theme (n = 444).

While proportional distribution of the six news foci suggests that *water management* is the dominant perspective on this issue, the long-term perspective reveals that the news foci have fluctuated and shifted over time. Between 2005 and 2015—the period when article numbers

increased—we first found a slight increase and then a slight decrease in articles that focus on the *environment* and *societal risk* associated with micropollutants (Figure 3).

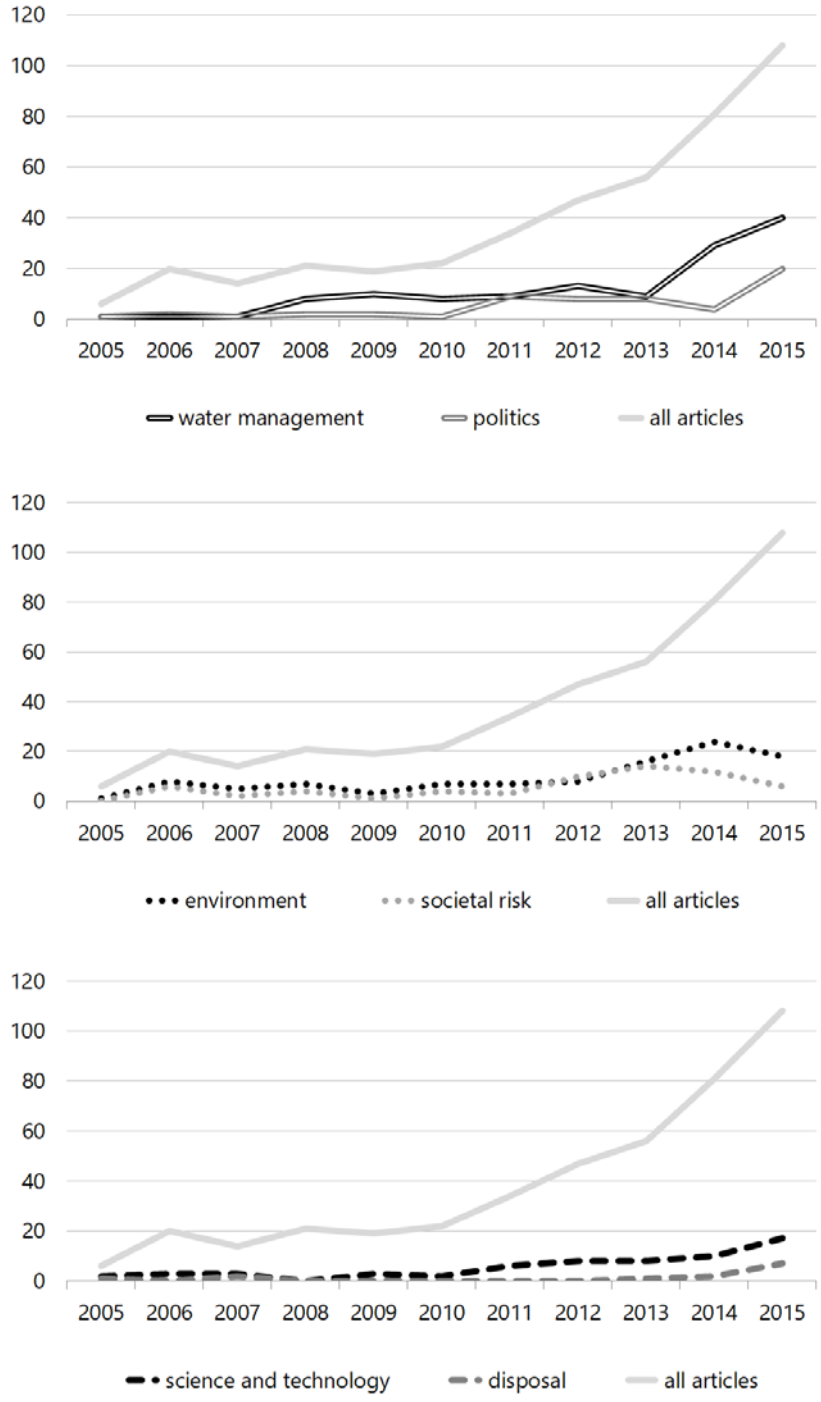

Fig. 3: Three patterns of shifting foci: Article numbers per year (2005–2015) and news focus – water management and politics (top), environment and societal risk (center), and science and technology and disposal (bottom).

Meanwhile, the *politics* focus slightly increased, especially in the German federal states of Baden-Württemberg and North-Rhine-Westphalia, which both have competence centers for micropollutants. The most significant increase can be observed in *water management*, which

explains why this news focus makes up the largest overall share of the reporting. Before 2005, we only found one article with a *water management* focus, but ten years later, in 2015, *water management* articles amount to more than 37% of our data. In contrast, the *societal risk* and *environment* foci account for 56% of the articles published before 2005 in our sample. Yet in 2015 their combined share is only 23%. There is no clear trend regarding the *science and technology* focus and the number of articles with *disposal* information is too small to discern any trend.

To sum up, the data indicates that the issue entered the German press in relation to different news foci and often only as a minor theme. The *societal risk* focus, which addresses micropollutants as a newsworthy topic in its own right, was less prominent. Nevertheless, the issue was raised in *politics, science and technology* articles related to water, informative articles regarding correct *disposal* and, of course, in articles with an *environment* or *water management* focus. This raises the question of whether these domain-specific news foci also affected the presentation of the issue.

Media frames: How was the issue presented?

To identify the media frames we concentrated exclusively on articles that treated micropollutants as one of their *main themes*, because those articles offered sufficient material for a more detailed content analysis. The earliest articles that meet this criteria were published in 2000.[5] As described in our methods (4), we analyzed the frames by studying their frame elements such as *problem definitions*, the description of *causes*, *moral judgements* and possible *solutions* or "remedies" (Entman, 1993). We found that the three most relevant news foci in this sample of 226 articles—*societal risk* (n=64), *water management* (n=51) and *environment* (n=43)[6]—each coincided with a dominant micropollutants frame. However, this does not rule out the mobilization of these frames under different news foci. Our analysis further revealed that the frames differed not only with regard to the "train of thoughts" they set in motion (Nisbet, 2009), but also in relation to the *relative importance of their elements* (Table 1). Their specific composition also developed over time as outlined below.

[5] Between 1995 and 1999, our sample contained no articles that dealt with micropollutants as a main theme.
[6] Among the articles featuring micropollutants as a main theme, 34 articles focused on *science and technology*, 25 articles on *politics* and 9 articles on *disposal*. We excluded them from the longitudinal framing analysis due to the patchy and limited number of articles per year.

Table 1: Dominant frames for the three most relevant news foci in our sample.

Media framings of micropollutants	Problem definition	Causes	Moral judgement	Potential solutions
Emerging concern (related to societal focus)	Micropollutants are a newfound problem. Advanced analytical tools mean that these tiny particles can now be detected. Later articles increasingly refer to the increasing risk of higher levels of pollution due to demographic change, changing lifestyles and climate change.	The causes are complex and related to various societal sources, including human urine and sewage. Most water treatment plants are not ready to deal with micropollutants. The characteristics of local water cycles and climate change can intensify the risk.	There are no obvious moral judgements in this framing. Instead, the framing acknowledges unknowns, uncertainties and systemic aspects.	There is no dominant solution in this framing. Instead, it mobilizes a variety of possible approaches and considerations. Articles either focus on one solution, or name a set of potentially complementary measures (multi-barrier approach).
Water quality issue (related to environment focus)	Water quality is endangered by micropollutants. While this is a fact, the possible effects remain uncertain. Trace contamination can harm water organisms and might pollute drinking water resources. Health effects on humans are possible but not proven.	Micropollutants enter the water cycle through multiple sources, e.g. household wastewater, industry, and agriculture. Politicians and water management experts who fail to act also contribute to the problem.	This framing names and blames polluters, but also acknowledges the moral dilemma (public health vs. pharmaceutical residues in the water cycle).	The focus is on effects (e.g. on fish) and causes (e.g. incorrect disposal of medicine). Concrete solutions and measures are less prominent (e.g. recommendations on how to correctly dispose of pharmaceuticals).
Managerial challenge (related to water management focus)	Micropollutants pose a challenge for wastewater treatment plants that have to meet legal requirements related to the protection and provision of drinking water and the "good ecological state" of surface waters (EU Water Framework Directive).	Polluted wastewater from households, hospitals and diffuse sources enter the water cycle. A lack of threshold values and non-existent or changing regulations add to the managerial challenge.	Public water management services are and should be committed to the minimization principle (as little water pollution as possible) and apply state-of-the-art water treatment. Efficiency goals and the "polluter pays" principle apply to financial aspects.	The focus is on advanced water treatment (mostly ozonation and active carbon) and on pilot projects that test the feasibility of fourth purification stages. Later articles mention the limits of water treatment and the need to tackle micropollution at its sources.
Color code for relative importance of framing elements:		least important element		dominant element

The *societal risk* focus introduces the problem of micropollutants as an *emerging concern*. The description of its causes is thereby important and oscillates between emerging awareness and emerging risk. On the one hand, micropollutants are a *newfound problem* that has emerged in part due to improved analytical methods. On the other hand, they are described as an *intensifying risk*, which is emerging not only due to better scientific understanding of the problem, but also as a result of broader societal developments such as an ageing German population, increased consumption of pharmaceutical products and, at least in some regions, climatic effects (original quote [a] in Appendix 2). The following quote is an example of this kind of problem definition:

> "Every German consumes on average 19.5 packages of medicine per year, part of which gets into the water via the canalization. […] Why is that becoming a problem? The degree of contamination can increase. We are sourcing water from [the rivers] Spree and Havel. Due to climate change the amount of water is decreasing in the long-run leading to a higher proportion of contamination even if the amount of contaminants that enter the system remains stable." *taz, die tageszeitung* 2009-03-21, [b].

The quote also illustrates the systemic framing of the complex causes of micropollutants. Not only do Germans take substantial amounts of medicine, which partly end up in rivers and lakes, but the relevance of these influxes also depends on the local situation and global dynamics. In Berlin, the problem is expected to intensify as the regional water system carries little water and is expected to carry even less in the future. Moral judgements are rare in the *emerging concern* frame. Instead, the emerging concern—as well as uncertainties and unknowns—is described in a multifaceted and comprehensive way. There is no dominant solution, although systemic, multi-barrier approaches are more prominent than in other frames. Some articles even refer to so-called "green pharmacy." In 2014, *Die Welt* published an article with the title "[h]undreds of pharmaceuticals put fish at risk. Chemists recommend better degradable substances" [c].

In articles with an *environment focus*, the problem is framed as a matter of water quality and pollution. This frame highlights the negative effects on water organisms as well as humans who consume the water. Compared to the *emerging concern* frame, the *water quality* frame presents micropollution more as a fact than an uncertain phenomenon. Solutions are less obvious in this frame, although moral judgements are more pronounced. For instance, the local newspaper *Aachener Nachrichten* (2015-07-15, [d]) reports on the issue without mentioning any possible remedies:

> "[T]he fact that almost half of the German population disposes old pharmaceuticals via the toilet or sink raises increasing concerns. Traces of the pharmaceuticals are detectable in drinking water."

Moral judgements explicitly acknowledge the moral dilemma of providing public healthcare and medicine while keeping pharmaceutical residues and hormones out of the water cycle. Moreover, actors are more explicitly *named and blamed*, e.g. ignorant politicians, the agricultural sector, and pharmaceutical consumers who use their toilet as trash bin. In 2011, several articles reported that the citizens of Cologne are the "greatest water polluters" in Germany. A commentator calls this "schizophrenic" as the pollution in the water raises the public cost of water treatment [e]. Despite these moral judgements and explicit environmental concerns, the *water quality* frame does not dramatize the issue of micropollutants. Some articles even compare them to more serious past and present water pollution. For instance, in 2008 the *Rheinische Post Düsseldorf* reported that the Niers River in North-Rhine Westphalia is much cleaner than it used to be, but is "still not freed from the last disturbing molecule," such as traces of pharmaceuticals, personal care products and hormones. Yet according to an expert they are "barely measurable" [f].

The *water management* focus tends to frame the problem as a managerial challenge with a strong focus on technological solutions. Although it outlines the main entry paths of micropollutants such as household and hospital wastewater, it rarely attributes responsibility to individuals, corporate or governmental actors. Instead, responsibility is attributed to wastewater treatment plants and water management experts are portrayed as proactive and solution-oriented. Thus, an innovative spirit is stronger than doubts in this frame. Technological experiments and measures are described as expert tasks and often linked to regulatory requirements. The EU Water Framework Directive and its goal to achieve a "good ecological status" in European surface waters is a key reference [g]. Missing or nonexistent regulation (e.g. a lack of threshold values or legal limits for micropollutants) and anticipated legislation are also important references for explaining and justifying preventive water management activities and infrastructure investments:

> "Brussels is currently discussing the removal of trace substances from wastewater. This includes pharmaceutical residues. This and the expected higher energy prices pose a challenge for the Niers water board." *Rheinische Post Düsseldorf* (2011-12-15) [h].

Within this technology-oriented frame, applied research and pilot projects are proposed as proactive ways to meet the managerial challenge, as they can be used to test the effectiveness

and feasibility of advanced water treatment. Water boards and governmental funding and investments play the main role in tackling this challenge. Many articles on pilot projects offer detailed information about how the projects are financed [i]. Inherent to the managerial challenge are two opposing moral judgments: While the minimization principle suggests that water should be as clean as possible using the latest available technology, the polluter pays principle contradicts the use of energy and cost-intensive technologies in public water treatment. As outlined below, these conflicting principles became more apparent over time.

Frame elements: Which solutions were proposed and did framings change over time?

In our long-term analysis we focused on the relationship between news foci, framing and frame elements, with particular emphasis on the "solutions" element. The public presentation of solutions can affect readers directly. For instance, technological *end-of-pipe* solutions concern readers as tax payers and water users, measures *at the source* concern them as water polluters, and multi-barrier approaches might concern them in both roles. In contrast, articles that do not specify possible solutions might not engage their readers in supporting or taking any measures. We investigated the question of whether different foci presented solutions in different ways.[7]

Our analysis shows a surprisingly clear picture (Figure 4, pie charts). Articles on *water management* tend to primarily present technological *end-of-pipe* solutions. Only 10 articles (20%) address multi-barrier approaches, which include all sorts of measures at the source and end-of-pipe. One article focuses exclusively on measures at the source, while two do not mention any solutions. In relation to the *environmental* focus, solutions remain *unspecified* in 47% of the 43 articles we analyzed. 12 articles (28%) suggest that the pollution should be tackled *at the source*. The remaining 25% of the articles with an *environmental* focus mention *end-of-pipe* solutions (16%) or *multi-barrier* approaches (9%). In contrast to these two news foci, the *societal risk* focus does not have a dominant pattern.

Over time, however, articles with a *societal risk* focus not only have the largest share of *multi-barrier* solution framings, but they also introduced the idea of concerted action earlier than the *environmental* and *water management* news foci (Figure 4, bar charts). The long-term

[7] These four empirical categories of solutions emerged in the coding process (see also section 2): "End-of-pipe" refers to advanced water treatment, particularly the implementation of a fourth purification stage. Interventions "at the source" address a broad range of rather complex solutions: making the pharmaceutical industry more sustainable, forbidding the use of sludge in agriculture, point-source treatment of industrial wastewater, and most importantly, the reduction of pharmaceutical influxes. This includes the correct private disposal of leftover medicines (via pharmacies and household rubbish instead of the toilet or sink), but also interventions in hospitals (decentralized water treatment, diapers for patients excreting x-ray contrast agents). "Multi-barrier" applies when articles mention solutions at the source as well as end-of-pipe. Finally, we categorized solutions as "unspecified" when no specific remedies were mentioned.

perspective reveals that the public presentation of solutions has increased in scope and become more diverse. In particular, *multi-barrier* approaches (scope) are addressed more frequently in more recent articles. Measures *at the source* were the dominant frame element in early articles with a focus on the *societal risk*, while *end-of-pipe* solutions were promoted in early w*ater management* articles. Both framings changed over time. *Societal risk* became increasingly linked to *multi-barrier* and also *end-of-pipe* solutions. The "problem definition" of the emerging concern also gained more substance, shifting from newfound towards intensifying micropollution.

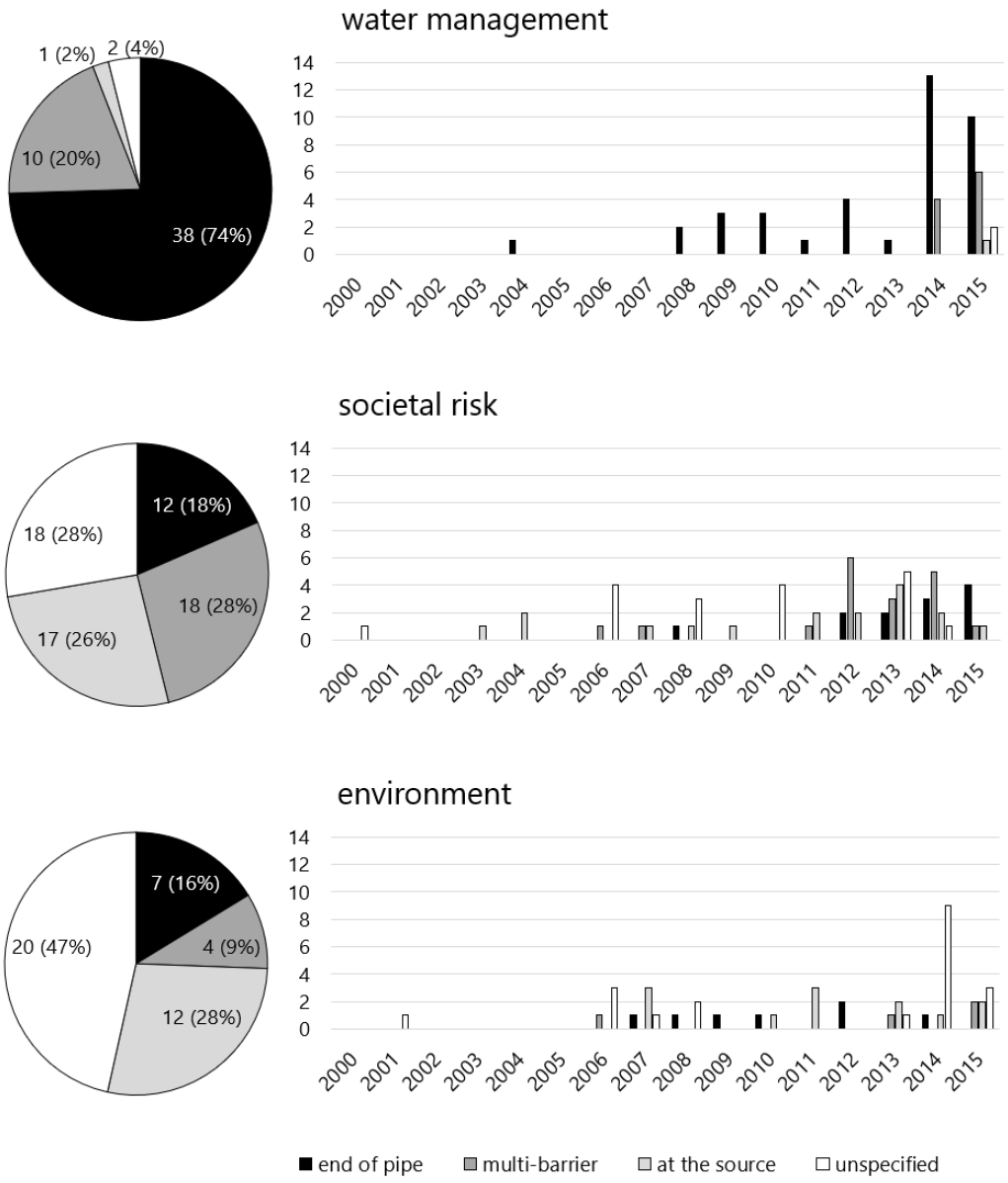

Fig. 4: The framing of solutions in the three most relevant news foci (2000–2015, n = 158), in total (pie charts) and over time (bar charts).

In *water management*, *end-of-pipe* measures first seemed the obvious solutions to the managerial challenge of micropollutants. However, recent articles have also incorporated *source*-related and *multi-barrier* approaches. This coincides with more critical reflections on the feasibility of technological solutions. While early articles about infrastructure projects often suggested that technological innovation could solve the problem and that everything was under control, later accounts point to the public cost of technological solutions (installation and energy) and their limitations (no universal solution available). The development from *end-of-pipe* towards *multi-barrier* also coincides with an increase in controversial positions. Reports on the pioneering role of local water management facilities give way to more controversial insights into the multifaceted water management challenge. In 2015 the *Stuttgarter Nachrichten* reported that Baden-Württemberg's Minister for the Environment criticized the EU's plans for "utopian" threshold values for specific micropollutants and that Stuttgart will face "hefty costs" to upgrade its water treatment plant, but will still not meet the EU requirements for rivers. "How can we explain that to the citizens?" asks the politician in the article [j].

One explanation for this reframing of the managerial challenge might be a shift in article pegs. In 2014 and 2015, reporting is no longer prompted by the approval of governmental funding, project launches and inaugurations of innovative pilot plants, but the results of projects and discussions about evidence-based steps for moving the issue forward. Accordingly, innovation stories about successful applications for funding and pioneering projects give way to critical assessments of technology and debates over whether expensive, advanced technologies should become the new standard for German wastewater treatment.

Finally, the *environment* focus frames solutions to the water quality problem in a less clear-cut way. Until 2008, unspecified solutions prevailed. Between 2009 and 2015, *source*-related solutions gained importance, accompanied by a slight shift from more general definitions of micropollutants as an ecological problem towards more human-centric concerns about the uncertain quality of drinking water.

6. Discussion: Micropollutants in routine reporting

Our findings support and substantiate our assumption regarding the newsworthiness of micropollutants in line with previous media analyses (cf. Baur & Wenzel, 2015; Sunderer et al., 2014). In particular, we observe that the issue was mostly raised in established areas of local reporting such as water management, environmental water protection and water governance. In

other words, the German press *routinely informed* readers about the activities and decisions of their regional administrations and public services.

The issue was therefore not presented as a hot topic, but instead portrayed in an unemotional way from the perspective of experts. Statements provided by experts were rarely contrasted with opposing views. When toxicologists, social scientists, water management experts and politicians were quoted in the same article, they were often partners in interdisciplinary research projects that were the subject of the media coverage. This lack of controversial framing is another sign that the issue was *not* hot. Journalists reporting on issues that are not hot topics tend to present conflicting views in separate stories as individual news events or information, rather than presenting them together in the same article (Sandman, 1988).

Furthermore, our analysis of frame elements adds a more differentiated perspective on the relationship between the solutions presented and their spokespeople in the press. Our findings support the assumption that journalists "simply adopt" the frames of the institutions and stakeholders whose activities they cover (Dunwoody & Griffin, 1993, p. 46). Dominant media frames were closely associated with domain-specific news foci and their expert stakeholders. Like in U.S. newspapers (Blair et al., 2017), technological end-of-pipe solutions such as advanced water treatment were the most frequently mentioned remedy in the German press, especially in the water management focus. However, this framing does not match the experts' views. As Baur and Wenzel found in their expert interviews, water management experts view educating the population as the most important measure (2014, p. 16). Water management experts also argue that end-of-pipe solutions should be accompanied by measures at the source (UBA, 2017).

Our long-term analysis also shows that frames cannot be clearly attributed to one specific group, as suggested by Blair and his co-authors (2017). For instance, the *emerging concern* frame was not linked to one specific expert group, but instead referenced scientists, water management experts and policymakers. More importantly, our data shows that the most dominant managerial framing of micropollutants privileges the views of pioneers, while more skeptical, ignorant or critical voices were long ignored. This bias resulted from the events or developments that prompted the reporting. Ten years ago, articles focused on technological pilot projects and presented possible solutions rather optimistically, if not enthusiastically. If water management experts remained silent or skeptical, there was nothing to report. This changed when political actors began to discuss binding regulations and the previously silent water management experts spoke up as critical voices. More recent reports about the results of pioneering water

management projects also framed solutions in more differentiated ways, quoting experts who talked about the limits of technology and promoted multi-barrier approaches.

Thus, our study confirms that the public presentation of specific solutions is associated with different actor groups (Blair et al., 2017), but also shows that these frames are still shaped by journalists and are not identical with expert frames. Instead, *media frames simplify German expert debates*, especially regarding end-of-pipe solutions, and often *miss the opportunity to publically promote no-regret measures* such as more environmentally friendly private disposal of pharmaceuticals (cf. Sunderer et al., 2014).[8]

Overall it seems that the framing of the issue has gained more scope and substance for public discourse in recent years. Possible measures are discussed in more differentiated and controversial ways and readers are addressed more explicitly. In articles focusing on the societal risk, the emerging concern also seems to have shifted from an epistemological towards an ontological problem description: We not only *know more* about micropollutants and are *better at detecting them*, but *there are and will be more* micropollutants in the future.

7. Conclusion

This exploratory study examined the presentation of aquatic micropollutants in the German press between 1995 and 2015 with the aim of better understanding how mass media shape emerging, invisible and ill-defined environmental issues. In line with previous studies, our analysis confirmed that German news reporting did not treat the issue as a hot topic during our study period and that the issue was neither dramatized nor personalized. Rather than highlighting the novelty, drama and personal dimension of micropollutants (Boykoff & Boykoff, 2007), the articles we analyzed contained cautious descriptions of the effects and restrained moral judgement regarding the causes. The issue was framed in non-alarming ways and informed newspaper readers about institutionalized public concerns such as public services and scheduled political events. There were also relatively few articles that explicitly addressed micropollutants in the water cycle as an emerging societal risk. Almost half of the articles we analyzed only addressed micropollutants as a *side issue* or with a focus on routinely reported themes like environmental protection or water management and governance. We conclude that early reporting on micropollutants in the German press was shaped by *routine reporting* rather

[8] Our data shows signs of growing awareness among journalists about disposal issues. We identified a small number of more recent articles that focus on and give specific information about the correct disposal of medicine.

than the journalistic hunt for sensational stories (Dunwoody & Griffin, 1993; Dunwoody & Peters, 1992).

But the routine reporting on micropollutants also has its flaws. In particular, we found that although the issue was and still is fraught with uncertainties, it was introduced and presented as an *expert issue* that is *under control*. The German press coverage of micropollutants also showed a *bias for innovative "techno-fixes"* (Huesemann and Huesemann, 2011), such as end-of-pipe water management solutions. Consequently, there seemed to be a *lack of critical voices* from expert stakeholders who were not actively engaged in research projects and who may be skeptical about end-of-pipe solutions. Most of the articles rely on expert voices, but represent *expert framings in a simplified way*. The episodic focus on research and innovation projects in water management created a misleading impression—contrary to the expert consensus—that technology could solve the problem (cf. Iyengar, 1991).

Finally, routine reporting also privileged local framings of this global issue and stressed local approaches rather than public reflection on unresolved and open questions regarding how this systemic problem should be addressed in ageing societies that use and consume increasing amounts of chemicals.

However, our study also demonstrates that media frames can develop over time. In the case of micropollutants, we found that press coverage of the issue has become more tangible and suitable for public debate, for example, by linking micropollutants to established societal concerns like climate change and by publicizing expert controversies about proposed solutions. This suggests that the problem and its possible solutions might become more of an issue of *public* concern (cf. Hird et al., 2014).

These recent developments also reveal the limitations of this study. Although it is possible to identify shifts, our data and analysis does not allow us to link our observations to "issue-attention cycles" (Downs, 1972; McComas & Shanahan, 1999). This concept can offer a salient starting point for further research.

We conclude that *routine reporting* might shape the public presentation of *emerging* environmental issues more than the hunt for sensational stories. This seems particularly true for the presentation of vague and invisible, but nevertheless complex techno-scientific issues in local and regional contexts. In such instances, *routine reporting* relies on highly institutionalized links between the press and its expert sources, which can lead to flawed public representations of expert framings. As we have shown, early reporting on micropollutants in the German press thus often framed the issue as an expert problem, rather than a public concern that affects newspaper readers in their roles as water consumers and polluters. A practical

implication of this finding could be that experts should reflect more on how they promote their complex problems to the media. A journalist working to tight deadlines who is reporting on the refurbishment of a local water treatment plant might not immediately realize that techno-fixes in water management represent only one possible solution to the wider emerging risk of micropollutants.

Last but not least, our findings have implications for media research into the public presentation of environmental issues. In particular, the unspectacular presentation of micropollutants in the water cycle suggests that media analyses into emerging environmental issues should focus more on routine reporting and also include news that only mentions emerging issues. Routine press coverage might tell us more than front page news stories in terms of how environmental issues are shaped in the early stages of their public life.

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Appendix 1: Newspapers in the Nexis data sample and number of articles on the issue

Newspaper	Articles	Newspaper	Articles
Aachener Nachrichten	5	Lampertheimer Zeitung	1
Aachener Zeitung	18	Landauer Neue Presse	0
Aar Bote	1	Lauterbacher Anzeiger	0
Allgemeine Zeitung	8	Main-Spitze	1
Alt-Neuöttinger Anzeiger	1	Mitteldeutsche Zeitung	6
Bayerische Gemeindezeitung	4	Neuss Grevenbroicher Zeitung	1
Bergische Morgenpost	2	Nordwest-Zeitung	0
Berliner Kurier	7	Nürnberger Nachrichten	6
Berliner Morgenpost	18	Nürnberger Zeitung	3
Berliner Zeitung	15	Oberhessische Zeitung	0
B. Z.	4	Odenwälder Echo	0
Der Tagesspiegel	13	Passauer Neue Presse	3
Die Welt Berlin	2	Rheinische Post Düsseldorf	61
Bürstädter Zeitung	3	Ried Echo	0
Darmstädter Echo	0	Rottaler Anzeiger	0
Deggendorfer Zeitung	0	Sächsische Zeitung, Zittau	1
Der Bayerwald-Bote	1	Sächsische Zeitung, Görlitz	1
Frankfurter Neue Presse	3	Sächsische Zeitung, Dresden	3
Frankfurter Rundschau	27	Schwarzwälder Bote	0
Gelnhäuser Tageblatt	3	Solinger Morgenpost	0
General Anzeiger	11	Starkenburger Echo	0
Giessener Anzeiger	4	Stuttgarter Nachrichten	19
Groß-Gerauer Echo	0	Stuttgarter Zeitung	39
Die Welt Hamburg	2	Südwest Presse	28
Hamburger Abendblatt	26	Usinger Anzeiger	0
Hamburger Morgenpost	0	Vilshofener Anzeiger	0
Hochheimer Zeitung	0	Main-Taunus Kurier	1
Hofheimer Zeitung	1	Wiesbadener Kurier	1
Idsteiner Zeitung	5	Wiebadener Tagblatt	2
Kölner Express	2	Wormser Zeitung	0
Kölner Stadt-Anzeiger	8	TAZ – Die Tageszeitung	20
Kölnische Rundschau	23	Die Welt	21
Kreis Anzeiger	3	Welt am Sonntag	3
Laichinger Tagblatt	1	Welt kompakt	2
		Sum	**444**

Appendix 2: Quoted article sections (German original)

[a] Rheinische Post Düsseldorf, 2012-12-14: „Die Tatsache, dass wir alle älter werden, schlägt sich seit geraumer Zeit auch im Abwasser nieder. Neben Pestiziden, die in beträchtlichen Mengen von Feldern und aus Gärten in Kanäle und Bäche gespült werden, finden sich immer größere Mengen an Arzneimitteln wie Diclofenac im Abwasser."

[b] taz, die tageszeitung, *(2009-03-21)*: „Jeder Deutsche nimmt im Schnitt pro Jahr 19,5 Packungen Medikamente zu sich, ein Teil der Wirkstoffe landet über die Kanalisation in den Gewässern. Aber es ist ja nichts Neues, dass solche Schadstoffe ins Wasser kommen. Warum wird das in Zukunft problematischer? Der Grad der Verschmutzung kann steigen. Wir gewinnen viel Wasser aus Spree und Havel. Durch den Klimawandel sinkt dort langfristig die Wassermenge, wodurch sich der Verschmutzungsanteil erhöht, auch wenn nicht mehr Schadstoffe zugeführt werden."

[c] Die Welt (2014-08-25): „Hunderte Arzneien belasten Gewässer und gefährden Fische. Chemiker raten zu leichter abbaubaren Wirkstoffen."

[d] Aachener Nachrichten (2015-07-15). die Tatsache, dass fast die Hälfte der Menschen in Deutschland alte Medikamente durch Toilette oder Waschbecken entsorgen macht zunehmend Sorgen. Spuren der Arzneimittel sind auch im Trinkwasser nachzuweisen.

[e] Kölnische Rundschau (2011-03-23): Das Verhalten vieler Mitbürger ist geradezu schizophren: Da wird einerseits die Höhe der Abwassergebüh-ren beklagt, für die sie selbst verantwortlich sind. Es ist kaum zu glauben, dass selbst Babywindeln, Spiel-zeug oder Kleidungsstücke durch die Toilette geschleust werden.

Bayerische Gemeindezeitung (2013-06-20): „Intensive Landwirtschaft, industrielle Abwässer und falsch entsorgte Medikamente belasten die Qualität unseres Wassers. Dabei ist Wasser nach wie vor Lebensmittel Nummer 1 und gerade deshalb besonders schützenswert. In Deutschland kann Trinkwasser direkt aus der Leitung getrunken werden und ist damit Basis für eine gesunde Ernährung."

[f] Rheinische Post Düsseldorf (2008-08-27): „Vom letzten störenden Molekül ist die Niers noch immer nicht befreit. Die Konzentration von Arzneimittelrückständen, hormonähnlichen Stoffen und Rückständen von Körperpflegemitteln im Flusswasser ist nach Angaben [des Vorstands des Niersverbands] allerdings so gering, ‚dass sie messtechnisch kaum noch nachweisbar sind'."

[g] Aachener Zeitung (2010-10-09): „[Eifel-Rur water board, executive manager]: ‚Mit dem Aktivkohleversuch an der Kläranlage Düren wollen wir auf jeden Fall für die Zukunft gewappnet sein.' Und in der warten noch große Aufgaben in der Gewässerrenaturierung auf

den Verband. Die EU-Wasserrahmenrichtlinie schreibt vor, dass bis zum Jahr 2027 alle Gewässer in ‚einen guten Zustand' überführt werden müssen."

Aar Bote (2014-05-10): „Die Maßnahme notwendig gemacht haben die EU-Wasserrahmenrichtlinien, die bis Ende 2015 die Erreichung eines guten Zustands aller Oberflächengewässer vorschreiben."

Stuttgarter Nachrichten (2014-08-07): „'Um den von der Wasserrahmenrichtlinie geforderten guten Zustand der Gewässer überall im Land zu erreichen, müssen ausgewählte Kläranlagen ihre Reinigungsleistung jedoch noch weiter erhöhen', sagt der Minister [„Umweltminister Franz Untersteller]."

[h] Rheinische Post Duesseldorf (2011-12-15): „Die Brüsseler Politik diskutiert zurzeit die Entfernung von Spurenstoffen aus dem Abwasser. Dazu gehören auch Arzneimittelrückstände. Dies und die zu erwartenden hohen Energiepreise stellen den Verband vor zusätzliche große finanzielle Herausforderungen.

[i] Südwest Presse (2015-03-04): „Aktivkohle holt Spurenstoffe aus dem Abwasser: Kläranlagen Arzneimittelrückstände, Weichmacher, Süßstoff, Desinfektionsmittel: Alles, was im Abwasser landet und in der Kläranlage nicht herausgefiltert wird, gelangt in den Vorfluter. Also in den Fluss, in den das Wasser von der Kläranlage fließt. Um solche organischen Spurenstoffe aufzufangen, ist im Klärwerk Steinhäule eine weitere Reinigungsstufe in Betrieb gegangen. 39 Millionen Euro hat die Aktivkohle-Adsorptionsanlage gekostet, 4,3 Millionen davon kamen von der EU, 2,6 Millionen vom Land. Das Land fördert auch die Nachrüstung der Kläranlagen in Laichingen und in Westerheim."

[j] Stuttgarter Nachrichten (2015-10-27): „Auf die Landeshauptstadt kommen saftige Ausgaben für den Ausbau ihres Hauptklärwerks zu. Die Wasserqualität des Neckars, in den behandelte Klärwässer eingeleitet werden, wird die Europäische Union aber trotzdem kaum zufriedenstellen. Das Problem sind Medikamentenreste. Darüber hat jetzt der baden-württembergische Umweltminister Franz Untersteller (Grüne) Klage geführt. Mit ihm hatten die Experten des Stuttgarter Hauptklärwerks über die utopischen Soll-Werte geredet. 'Wie sollen wir das den Bürgern erklären?', fragt auch Untersteller. Er befürchtet, dass der Neckar und viele andere Gewässer trotz eines hohen Aufwands in die Problemstufe Rot der EU-Kategorien für Fließgewässer eingestuft werden."